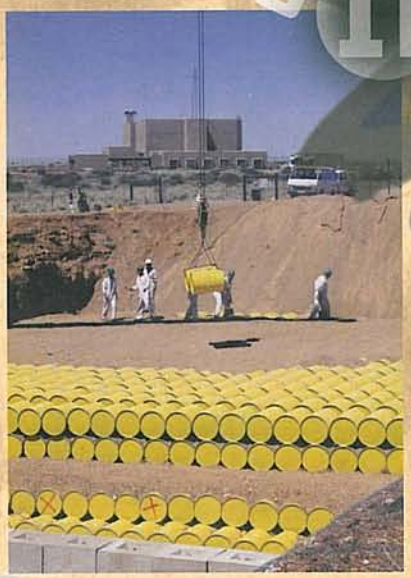
protection against nuclear damage







annualreport 2006/07

NATIONAL NUCLEAR REGULATOR

This Annual Report is submitted to the Minister of Minerals and Energy in accordance with section 7(1)(j) of the National Nuclear Regulator Act, (Act No. 47 of 1999). The report reflects the outcome of the NNR's activities in terms of the health and safety of workers, the public and the environment associated with nuclear authorised sites and the financial aspects thereof in accordance with Section 55 of the Public Finance Management Act, (Act No. 1 of 1999).

Vision

To be a leading, impartial authority for the regulation of the safe use and handling of nuclear and radioactive material.

Mission

To provide an effective and efficient national regulatory framework for the protection of persons, property and the environment against nuclear damage through:

- *Excellence in nuclear regulatory practices, and*
- *Human resources and transformation practices best suited for the nuclear regulatory needs of the nation.*

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Protection Nucléaire

Chairperson's Report

1



Prof May A Hermanus
Chairperson

I have pleasure in submitting the annual report of the National Nuclear Regulator (NNR) for the year 2006/07 to the Honourable Minister of Minerals and Energy, Ms BP Sonjica, in accordance with section 7(1) (j) of the National Nuclear Regulator Act (Act No. 47 of 1999).

My appointment as Chairperson of the NNR took effect on 1 December 2006, and accordingly I wish to thank my predecessor in this office, Prof Krish Baruth-Ram, and the Board of Directors that operated under his leadership, for their efforts and diligence in their stewardship of the NNR.

Prof Baruth-Ram referred in last year's annual report to the unprecedented events at Koeberg Nuclear Power Station during that year, which caused the closure of one of the generating units for a period. The events concerned are referred to more fully in the body of this report. Suffice for me to say that even though the damage to the unit held no radiological implications, enhanced regulatory and operational measures are in place to prevent recurrence of such events.

Looking to the future of Koeberg Nuclear Power Station, the NNR entered into discussion with Eskom during the year on the scope of the second Koeberg periodic review which will commence in 2008. The NNR regards this project as a valuable means of comparing the Koeberg plant design and operations with current international safety standards and practices.

Section 29 of the NNR Act requires the holder of a nuclear installation licence to provide financial security and liability for nuclear damage. Work on the ongoing financial liability project during 2006/07 has progressed to the point where a preliminary report has been compiled and is under review.

The Multinational Design Evaluation Programme (MDEP) was initiated by the United States Nuclear Regulatory Commission (USNRC) to facilitate co-operation among nuclear regulators on new reactor designs intended for construction worldwide. Participation in the MDEP initiative is of particular importance to the NNR, given the potential construction of new reactors in South Africa and to benchmark the country's Pebble Bed Modular Reactor (PBMR) project with other new reactor designs.

A vital aspect of the work and functions of the NNR is that of communication with stakeholders and outreach initiatives to the public. In this respect, co-operative governance agreements between the NNR and several government departments were initiated and will be completed in the next reporting period, however implementation of the agreements has already commenced. The NNR also conducted numerous public and public body outreach programmes during the reporting period. International co-operation and liaison was, as always, high on the NNR's priority list, enabling NNR specialists to extend their knowledge through participation in international forums and scientific visits.

The NNR remains committed to the Government's transformation policy and plan and, during the reporting period, focused on making further changes to improve every aspect of the organisation's business within the framework of current legislation.

In terms of capacity building, the NNR is challenged in sustaining an appropriate level of in-house technical capacity (engineers and scientists) to deliver on its core business. The expanding nuclear programme, introduction of new technologies such as the PBMR and resurgence in uranium mining, bring yet further increased competition for scarce skills. As a matter of priority, the NNR has proactively engaged in strengthening its in-house capacity. It also contributes significantly to South Africa's national capacity building programmes in the nuclear field.

The NNR's total operating revenue for the year was R68,2 million, of which R53,5 million was derived from services rendered to holders of nuclear licences (Koeberg Nuclear Power Station, the PBMR project, and the South African Nuclear Energy Corporation (Necsa)) and holders of certificates of registration (mines and small users of radioactive materials and processes). R14,7 million came by way of direct Government grant.

In conclusion, I wish to thank all the managers and staff of the NNR for their sustained efforts during the year. I look forward to working with the Board, management and staff during the coming year, in meeting the mandate of the NNR and its responsibilities to the people of South Africa.

Prof MA Hermanus
Chairperson

Chief Executive Officer's Report

2



Mr Maurice T Magugumela
Chief Executive Officer

2.1 Overview

The NNR has made good progress in a number of strategic objectives set at the beginning of the 2006/07 period. The following represent the highlights of the year under review, the details of which follow in the body of the report.

2.2 Monitoring and Control of Developments in the Vicinity of Koeberg Nuclear Power Station

The NNR received a submission from the City of Cape Town of its criteria and processes for assessment and control of developments in the vicinity of Koeberg Nuclear Power Station. This submission was made in accordance with Regulation 287 concerning developments in the vicinity of nuclear installations, and in respect of NNR Regulatory requirements governing the control and monitoring of development within the Emergency Planning Zone of Koeberg Nuclear Power Station for review and acceptance by the NNR as required by the regulation.

The preparation of these deliverables by the city has been under considerable pressure in view of the fact that major developments within the 16 km radius of Koeberg have been on hold for several years. These developments involve housing for up to 300 000 additional people in this area, within the lifetime of Koeberg, which could seriously challenge the viability of the Koeberg Emergency Plan if not controlled within the regulatory requirements.

The submission could not be approved, due mainly to an incomplete traffic evaluation model and the absence of a documented assessment process for disaster management to establish the infrastructure needs to enable the implementation of the Koeberg Emergency Plan.

2.3 Variation 26 of Necsa NL-27 Licence

The NNR issued the revised Necsa Installation Licence. The main reasons for issuing a new licence were:

- The need to give effect to the name change of the authorisation holder from "Atomic Energy Corporation" to "South African Nuclear Energy Corporation";
- General revision of the Licence to better define the scope of authorised activities;
- The need to more clearly define the NNR requirements, taking account of international experience and stakeholder feedback; and
- To progress the application of Process Based Licensing at facilities run by Necsa.

The issuing of the licence was the subject of an appeal by Necsa to the Minister of Minerals and Energy, on the grounds that the issue of a site licence was contrary to the provisions of the NNR Act.

In accordance with the provisions of section 45(3) of the NNR Act, regarding an Appeal to the Minister against a decision of the NNR Board, after considering the grounds of appeal and the Board's reasons for the decision, the Minister must as soon as practicable:

(a) Confirm, set aside or vary the decision; or
(b) Substitute any other decision for the decision of the Board.

The NNR has submitted its reasons as to why the licence issued is not contrary to the provisions of the NNR Act and the Minister's decision is expected early in the next reporting period.

2.4 NNR Regulatory Self Assessment

The NNR conducted a self assessment of its regulatory infrastructure and practices to ensure that it employs international best practice in its processes. This self-assessment was based on the International Atomic Energy Agency's Integrated Regulatory Review Service (IRRS) guidelines. Due to the extensive nature of the exercise, several phases were planned. Only Phase I of the assessment has been completed. In the next financial year (2007/08), the self-assessment will be extended to the remaining areas. The review highlighted a few findings and observations and recommendations for improvements. These relate mostly to the need for consistency of practices and approaches across all divisions of the NNR and the need for clearer procedures for processes related to authorisations, enforcement, inspections, review plans and training/induction programmes. Implementation of the findings of the first phase of the assessment will commence in the 2007/08 financial year.

2.5 Approval of the Restructuring Process

During the reporting period the NNR Board approved the proposed structure of the NNR as part of the overall restructuring process. The restructuring of the NNR is geared to appropriately respond to the challenges of an expanding nuclear industry so that the Regulator is better able to exercise its oversight function and also to build and maintain its technical capacity, notwithstanding competition for skills within the industry. The implementation phase will follow a consultation process with recognised labour unions. Due care will be exercised to ensure that the implementation process does not disrupt the business of the NNR.

2.6 Progress with the Information Communication and Technology (ICT) Strategy

The NNR has streamlined and optimised its business processes and systems to enable it to more efficiently and effectively carry out its mandate. The ICT strategy has been developed to align information systems and technology with the strategic business direction of the organisation. The ICT strategy was approved by the NNR Board and will be implemented over three years, starting in July 2007.

2.7 International Co-operation

Internationally, the NNR continued to participate in multilateral activities at various forums. These activities included:

- Participation in the development of safety standards at the IAEA;
- Liaising with international counterparts as part of its commitment to keep abreast of international developments in the regulation of the nuclear industry. Co-operation with the French Regulator, the ASN, continued to strengthen, with a steering committee meeting having taken place here in South Africa, hosted by the NNR. The NNR signed a new bilateral agreement with the Argentine regulatory authority and is in negotiations to renew others which have lapsed; and
- Co-operation with other Regulators in the MDEP programme, which brings together regulators who are facing the same challenges in terms of licensing new designs, to develop common criteria to be used in reviewing these designs.

2.8 Regulatory Enforcement Actions taken by the NNR

During the year under review, the NNR took a number of significant actions to enforce legislation and regulatory requirements. These actions included:

2.8.1 Regulatory Action in Respect of Manufacturing of Components Important to Safety by PBMR

The NNR became aware that PBMR had commenced with certain activities relating to the manufacturing of components important to safety, without the necessary regulatory control and oversight. The NNR took immediate steps to ensure compliance by directing Eskom, the licence applicant, to suspend all activities related to the manufacturing of these components of high safety significance until the necessary information had been provided to the Regulator to allow regulatory control to be exercised. An investigation was immediately ordered by the Regulator into what had led to the breach of regulatory requirements and processes. The NNR suspended all discussions with the licensee on manufacturing until these conditions were met.

Investigation reports were submitted to the NNR by Eskom, on the basis of which the regulatory discussions relating to manufacturing were resumed. A roadmap, detailing the way forward, in order to facilitate the lifting of the suspension was formally communicated to Eskom on the actual manufacturing of components. The suspension would remain in place until all preconditions were fulfilled.

2.8.2 Closure of Non-Complying Mines by the NNR

During the year under review, the NNR directed two mines, President Steyn Gold Mine and Gravellotte Mine Limited, to discontinue operations as a result of failure to comply with the requirements of the NNR. During routine inspections, NNR inspectors found that at one of the mines, workers were being exposed to radiation levels above the NNR regulatory limits. In the case of the second mine, it was found not to be in compliance with conditions of authorisation on a recurring basis. This action was necessary since, from the dose projections, the NNR determined that the mines would exceed the annual dose limit. The NNR ordered the facilities to discontinue operations, as continued operation would have compromised the safety of the workers due to high levels of radiation from radon gas. Further detail is provided in section 8.12 of this report. The mines were allowed to restart operations once compliance with regulatory requirements was achieved.

2.8.3 Enforcement Action on a Ship Carrying Radioactive Material which Docked without Authorisation

A ship, contracted by Rossing Uranium Limited (Rossing) of Namibia, and carrying a shipment of Uranium Oxide, docked in Durban Harbour without authorisation from the NNR. The NNR took immediate steps to prosecute the shipping company for breach of the NNR Act. The ship was impounded and the Master of the ship was taken into custody and formally charged. The company admitted guilt and was fined R250 000.00, which was paid before the ship was allowed to leave port.

2.9 Challenges

The NNR continued to experience challenges in other areas.

2.9.1 Retention and Attraction of Skilled Personnel

The NNR continued to experience difficulties in sustaining an appropriate level of in-house technical capacity (engineers and scientists) to deliver on its core business. This challenge is expected to grow as a result of increased competition for scarce skills. As a matter of priority, then, the NNR has proactively engaged in strengthening its in-house capacity, identifying

strategic initiatives that will enable it to develop the technical expertise of its human resources, and also enhancing its ability to attract and retain scarce talent. The NNR has developed remuneration and performance management systems that, in the short- to medium-term, will allow the NNR to attract, develop and retain staff to maximise internal capacity.

2.9.2 *Turnaround Times for Review of Submissions from Authorisation Holders*

As part of its core business the NNR reviews safety assessments and applications for new actions and existing authorisation holders. One of the indicators used by the NNR to measure its performance is the turnaround time of reviews of documents submitted to it. An average of 90 days was used as an indicator of how quickly reviews should be concluded.

While in most areas this target was met during the period under review, this was not the case in respect of applications and submissions from Naturally Occurring Radioactive Material (NORM) industries, largely due to a substantial increase in the number of these applications for authorisation. In this situation, the NNR informed the applicants and a new time frame was agreed. Additional human resources will be required to ensure that in the future, processing of submissions is not unduly delayed.

2.9.3 *Annual Dose Limit Exceeded at an Underground Mine*

Over the past few years, there has been a continuous downward trend in the number of workers exposed to doses higher than regulatory limits as a result of mining operations. Whilst for the previous financial year this number stood at eight workers, the number of over-exposed individuals for the year under review was two. The exposures occurred in the same facility and the facility was directed by the Regulator to discontinue operations until corrective actions were taken. Whilst there has been an improvement, it is not acceptable to the NNR that there are still workers exposed to radiation above the regulatory limit. The NNR will continue to vigorously enforce standards and regulations to ensure that no over-exposures occur in facilities over which it has authority.

2.9.4 *Co-operative Agreements*

Co-operative agreements have presented a challenge in respect of their finalisation. This has been largely due to the fact that:

- Whilst the NNR is compelled by the NNR Act to enter into these agreements, there appears to be no such requirement for other entities with which we need to engage and as a result this is not a high-priority requirement in their programmes, resulting in delays;
- The process is highly complex in certain instances, for example, with respect to the Department of Transport, the NNR needed to enter into agreements with three entities, namely the Civil Aviation Authority, the South African Maritime Safety Authority, and the Rail Safety Regulator; and
- Change of leadership, general staff movements and lack of continuity, both within some of the institutions and the NNR, have led to delays.

Due to the number of these agreements, it is necessary to re-look at the process with a view to simplifying and improving it.

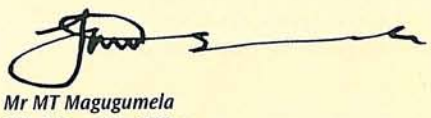
2.10 Looking Ahead

For the next reporting period, the strategic priorities of the NNR include:

- Continuing to develop, review and implement appropriate regulatory policies, practices and effective compliance monitoring by strengthening the analytical verification capability and capacity of the NNR Laboratory; strengthening the regulatory enforcement regime; and strengthening the NNR's regulatory research programmes in support of the regulatory process;
- Building stakeholder confidence in South Africa's nuclear regulatory system through the implementation of a communications policy to improve public understanding of the issues relating to the nuclear sector; providing accurate and timely information about the safety performance of authorisation holders to stakeholders; and enhancing the efficacy and frequency of face-to-face stakeholder engagement processes;
- Improving and strengthening internal business processes, aligned to best practice and responsive to environmental dynamics, through the implementation of an integrated management system to ensure excellence in internal business processes; sound financial administration; and good corporate governance; and
- Attracting, developing and retaining staff to maximise internal capacity through the use of an innovative talent management strategy to achieve a high quality, diverse work force with the skills needed to achieve the NNR's vision; reducing the NNR reliance on external technical support by building capacity within the organisation; realignment of policies, procedures and practices to advance the transformation imperative; and ensuring a sustainable safety assessment capability in order to conduct safety assessment reviews for the granting or refusal of authorisations for new actions and the approval of changes to existing actions.

2.11 Appreciation

I wish to convey my sincere appreciation to the Minister of Minerals and Energy, the Director-General and his staff for their support. I thank both the outgoing Board and the new Board of the Regulator for their guidance and unwavering support. I thank and pay tribute to the management and staff of the NNR for their efforts and hard work during the year in the execution of our mandate, and I wish to assure all stakeholders of our sustained endeavours in their respective interests.



Mr MT Magugumela
Chief Executive Officer

Legislation

3

3.1 The National Nuclear Regulator Act

The National Nuclear Regulator is established in terms of the National Nuclear Regulator Act (Act No. 47 of 1999), (NNR Act); which came into effect on 20 February 2000. The mandate of the NNR is to provide for the protection of persons, property and the environment against nuclear damage through:

- The establishment of safety standards and regulatory practices;
- The exercise of regulatory control over nuclear installations, vessels propelled by nuclear power or having radioactive material capable of causing nuclear damage on board and any action capable of causing nuclear damage, to which the NNR Act applies, through the issue of nuclear authorisations and the provision of assurance of compliance thereto; and
- Ensuring that provisions for nuclear emergency planning are in place.

The facilities and actions regulated by the NNR are diverse, including the operation of nuclear power reactors, research reactors, nuclear fuel fabrication, nuclear technology applications and the mining and processing of uranium and other radioactive ores.

The NNR is also mandated to:

- Advise the Minister of Minerals and Energy on matters falling within its purview;
- Fulfil national obligations in respect of international legal instruments concerning nuclear safety; and
- Act as the national competent authority in connection with the International Atomic Energy Agency's Regulations for the Safe Transport of Radioactive Material.

The NNR Act does not apply to:

- Exposure to cosmic radiation or Potassium-40 in the body;
- Group III Hazardous Substances;
- Group IV Hazardous Substances; or
- Any action where the radioactivity concentration is below the exclusion level specified in the Regulations on Safety Standards and Regulatory Practices (RSRP).

3.2 Regulations Published under the NNR Act

The following regulations have been published, in terms of the provisions of the NNR Act:

Table 1: Regulations Published in terms of the National Nuclear Regulator Act

Section in the NNR Act	*Description*	*Regulation Number*	*Date Published*
21(1) and 22(1)	Format for the Application for a Nuclear Installation Licence or a Certificate of Registration	479	12 May 2000
6(3)	Co-operative Governance in respect of the monitoring and control of radioactive material or exposure to ionising radiation	709	24 May 2002
38(4)	Development Surrounding any Nuclear Installation	287	5 March 2004
26(4)	Establishment of Public Safety Information Forums	299	12 March 2004
36	Safety Standards and Regulatory Practices	388	28 April 2006
7(1)(j)	Content of the Annual Report	716	26 July 2006
37(3)(a)	Keeping of Records of all Persons in a Nuclear Accident Defined Area	778	4 August 2006

3.3 Safety Standards and Regulatory Practices

Section 36 of the NNR Act provides that the Minister must, on the recommendation of the Board, make regulations regarding safety standards and regulatory practices. The Minister published Regulation R388 regarding Regulations on Safety Standards and Regulatory Practices (RSRP) in April 2006.

The RSRP includes:

- Risk criteria which address the mortality risk to the public (present and future generations) and the workforce;
- Radiation dose limits to members of the public and the workforce arising from normal operations and from design basis accidents;
- Fundamental safety principles (including as Low as Reasonably Achievable (ALARA) and defence-in-depth);
- General safety principles relating to the requirement to comply with international norms and practices; and
- Requirements for emergency planning.

3.4 Co-operative Agreements

In accordance with the provisions of section 6 of the NNR Act, the NNR is required to enter into co-operative governance agreements with other organs of state that have overlapping functions or responsibilities. The purpose of the agreements is to:

- Ensure the effective monitoring and control of nuclear hazards;
- Co-ordinate and minimise the duplication and procedures for the exercise of such functions; and
- Promote consistency in the exercise of such functions.

The NNR has identified 11 entities with which co-operative agreements were required. These co-operative agreements are at different stages of completion. The following table details the status of co-operative governance agreements as at 31 March 2007:

Table 2: Status of Co-operative Governance Agreements

Organ of State	*Status*
Department of Health – Directorate Radiation Control	Final publication
Department of Minerals and Energy – Mine Health and Safety Inspectorate	Final publication
Department of Minerals and Energy – Electricity and Nuclear	Final publication
Department of Water Affairs and Forestry	Final publication
Department of Transport – Civil Aviation Authority (CAA)	Final publication
Department of Transport – South African Maritime Safety Authority (SAMSA)	Final publication
Department of Labour	Agreement was issued for public comments and has now been signed by NNR and is awaiting signature by Department of Labour
Department of Transport – Railway Safety Regulator (RSR)	To be released for public comment in June 2007
Department of Minerals and Energy – Mineral Development	To be released for public comment in June 2007
Department of Environmental Affairs and Tourism	To be released for public comment in June 2007
Department of Transport – Road Transport Management Corporation (RTMC)	RTMC has just recently been established. Discussions were at a preliminary stage with the newly established RTMC

It is anticipated that all agreements will be finalised by September 2007.

3.5 International Safety Conventions

The International Atomic Energy Agency (IAEA) facilitates the establishment of international conventions on nuclear safety. These are legally binding international instruments which are required to be ratified by country legislatures before they can be implemented. The Conventions place obligations on member states. South Africa is a signatory (Contracting Party) to:

- The Convention on Nuclear Safety; and
- The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

In terms of section 5(e) of the NNR Act, one of the objectives of the Regulator is to "fulfil national obligations in respect of international legal instruments concerning nuclear safety". The NNR is the competent national organisation with respect to implementation of the above two Conventions.

3.5.1 Convention on Nuclear Safety

South Africa ratified the Convention on Nuclear Safety (CNS) in 1996 and South Africa's obligations under the CNS entered into force on 24 March 1997. The obligations of the Contracting Parties are based on the principles contained in the IAEA Safety Fundamentals document "The Safety of Nuclear Installations". These obligations cover aspects such as siting, design, construction, operation, the availability of adequate financial and human resources, the assessment and verification of safety, quality assurance and emergency preparedness.

The CNS is an incentive instrument and is based on the common interest of Parties to achieve higher levels of safety which will be developed and promoted through regular meetings of the Parties. The CNS obliges Parties to submit country reports on the implementation of their obligations for "peer review" at meetings of the Parties to be held at the IAEA. The next review meeting is scheduled for April 2008.

During 2006, the NNR initiated the compilation process for the 4th National Report, which included a detailed project plan. The scope of the 4th National Report covers Articles 6 to 19 of the CNS which is applicable to two nuclear installations, namely Koeberg Nuclear Power Station and the Pebble Bed Modular Reactor.

The information to be provided in the 4th National Report will address the following:

- Changes in national situation since the last report was presented in April 2005;
- Information to be provided in the 4th report as requested during the 3rd Review Meeting of the CNS in April 2005; and
- Comments and suggestions from the last Review Meeting in April 2005.

3.5.2 *The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*

South Africa acceded to the Joint Convention in November 2006 and South Africa's obligations under the Joint Convention entered into force in February 2007. The Joint Convention applies to spent fuel and radioactive waste resulting from civilian nuclear reactors and applications, and military or defence programmes, if and when such materials are transferred permanently to and managed exclusively within civilian programmes, or when declared as spent fuel or radioactive waste for the purpose of the Joint Convention by the Contracting Party. In addition, the Joint Convention applies to planned and controlled releases of liquid or gaseous radioactive materials from regulated nuclear facilities into the environment.

The obligations of the Contracting Parties with respect to the safety of spent fuel and radioactive waste management are based, to a large extent, on the principles contained in the IAEA Safety Fundamentals document "The Principles of Radioactive Waste Management", published in 1995. They include, in particular, the obligation to establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management and the obligation to ensure that individuals, society and the environment are adequately protected against radiological and other hazards, *inter alia*, by appropriate siting, design and construction of facilities and by making provisions for ensuring the safety of facilities both during their operation and after their closure. Contracting Parties are also obliged to take appropriate steps to ensure that disused sealed sources are managed safely.

Regulation of Nuclear Activities

4

In accordance with the provisions of the NNR Act, the NNR is mandated to exercise regulatory control over nuclear installations, nuclear vessels and other actions capable of causing nuclear damage.

The purpose of the regulatory process is to ensure the protection of persons, property and the environment from nuclear damage. The regulatory process entails authorisation, safety case review and assessment, and the undertaking of compliance assurance and enforcement activities as appropriate.

4.1 *Nuclear Authorisation Process*

Prior to the granting of an authorisation the applicant is required to apply to the NNR, in the prescribed format, detailing the intended activities and demonstrating the safety and compliance with the NNR requirements. The documentation submitted must address safety with respect to the design of any facilities concerned and safety in terms of constructing, commissioning, operating, maintaining and decommissioning.

The authorisation conditions represent the framework within which the applicant or holder of the nuclear authorisation is obliged to adhere to particular requirements in respect of design, operation, maintenance and decommissioning. The conditions of authorisation also oblige the holder of the authorisation to demonstrate compliance through the submission of routine and non-routine reports.

Standard conditions included in a nuclear authorisation address:

- The description and configuration of the authorised facility or action;
- Requirements in respect of modification to facilities;
- Operational requirements in the form of operating technical specifications, procedures or programmes as appropriate;
- Maintenance testing and inspection requirements;
- Operational radiation protection programmes;
- Radioactive waste management programmes;
- Emergency planning and preparedness requirements as appropriate;
- Physical security;
- Transport of radioactive material;
- Quality assurance; and
- Reporting.

The NNR Act makes provision for the granting of four categories of nuclear authorisation. These are:

- Nuclear Installation Licences;
- Nuclear Vessel Licences;
- Certificates of Registration; and
- Certificates of Exemption.

These enable the NNR to issue authorisations that are commensurate with the hazards posed by the relevant facility or action.

4.2 *Safety Case Review and Assessment*

A safety case is a collection of safety arguments and evidence in support of the safety of a facility or action. The safety case provided must identify and characterise all sources of radiation associated with the facility and all possible exposure pathways that may arise from such sources, under normal operating conditions and under accident situations.

The NNR undertakes an evaluation of the submitted documentation to ensure that the action or facility will meet the standards and requirements. From the evaluation, conditions are identified for inclusion in the nuclear authorisation.

4.3 *Compliance Assurance*

The NNR conducts compliance assurance activities to determine the extent to which holders of nuclear authorisations comply with the conditions of authorisation. The nature of the NNR's compliance assurance activities are commensurate with the nature of authorisation issued and the risk posed by the facility or action.

The compliance assurance activities involve a combination of audits, routine inspections, non-routine inspections, reviews of routine reports and reviews of occurrence reports.

4.4 Enforcement

Where non-compliance with the conditions of authorisation is identified, the NNR may initiate enforcement actions. Enforcement actions are designed to respond to non-compliances with specified conditions and requirements. The enforcement actions are commensurate with the seriousness of the non-compliance and may take the form of written warnings, penalties, curtailment of operations, suspension of the authorisation, or ultimately withdrawal of the authorisation. In all cases, the holder of the authorisation is required to:

- Remedy the non-compliance;
- Perform a thorough investigation in accordance with an agreed timescale; and
- Take all necessary measures to prevent recurrence.

In certain instances, the NNR performs its own investigation.

4.5 Nuclear Authorisations Issued by the NNR

The following table details the holders of nuclear authorisations granted by the NNR:

Table 3: Nuclear Authorisation Holders

Nuclear Installation Licences			
1.	Eskom - Koeberg Nuclear Power Station	2.	Necsa - Installations on the Pelindaba site
3.	Necsa - Vaalputs National Radioactive Waste Disposal Facility		
Certificates of Registration			
1.	Alnieuwco Recycling (Pty) Ltd	2.	African Rainbow Minerals Gold/Harmony Freegold Joint Venture Company (Pty) Ltd (Joel Operations)
3.	Anglo American Research Laboratories (Pty) Limited	4.	African Rainbow Minerals Gold/Harmony Freegold Joint Venture Company (Pty) Ltd (St Helena Operations)
5.	Anglo Operations Limited (Scaw Metals)	6.	Avgold Limited - Target Division
7.	Anglo Operations Limited (Rand Scrap Iron)	8.	Blyvooruitzicht Gold Mining Company Limited
9.	BG Scrap Metals (Pty) Ltd *	10.	Consolidated Modderfontein (Pty) Ltd
11.	BHP Billiton SA Limited T/A BHP Billiton – Johannesburg Technology Centre	12.	Crown Gold Recoveries (Pty) Ltd
13.	Enzel Twenty CC T/A CJN Metal Dealers CC *	14.	Mr David Salomon
15.	Cronimet (RSA) Pty Ltd	16.	Durban Roodepoort Deep Limited
17.	CSIR, Building 37	18.	East Rand Proprietary Mines Limited
19.	Denel (Pty) Ltd	20.	Evander Gold Mines Limited
21.	Donnlee Engineering (Pty) Ltd	22.	Foskor Limited (Phalaborwa)
23.	Extractech (Pty) Ltd	24.	Foskor Limited (Richards Bay)
25.	First Wesgold Mining (Pty) Ltd	26.	GFI Mining SA (Pty) Ltd (Kloof Operation) Kloof *
27.	Glenover Phosphate Limited (Germiston Site)	28.	GFI Mining SA (Pty) Ltd (Kloof Operation) Leeudoorn *
29.	High Energy Mining CC	30.	GFI Mining SA (Pty) Ltd (Kloof Operation) Libanon *
31.	Huntrex 196 Pty Ltd T/A Ceracast	32.	GFI Mining SA (Pty) Ltd (Beatrix Operation) *
33.	Hydro Power Equipment (Pty) Ltd	34.	GFI Mining SA (Pty) Ltd (Driefontein Operations) *
35.	Kusasa Logistics (Pty) Ltd	36.	GFI Mining SA (Pty) Ltd (Oryx) *
37.	Linbeck Metal Trading (Pty) Ltd	38.	Glenover Phosphate Limited (Mining Site Operation)
39.	Microzone Trading 69 CC	40.	Gravelotte Mines Limited
41.	Mineworkers Recycling Services	42.	Grootvlei Mines (Pty) Ltd
43.	MTC Demolition CC *	44.	Industrial Zone Limited
45.	North West Reclaiming	46.	Kynoch Fertilizer Limited
47.	Potchefstroom Plastiek Herwinning CC	48.	Kynoch Modderfontein (Pty) Ltd
49.	Rampete Metal Processors (Pty) Ltd	50.	Mine Waste Solutions (Pty) Ltd
51.	The Big Bin CC	52.	Nigel Gold Mining Company Limited
53.	The Forensic Science Laboratory, SA Police	54.	Omnia Phosphates (Pty) Ltd
55.	The Reclamation Group (Pty) Ltd (Welkom Operations)	56.	Palaborwa Mining Company (Pty) Ltd
57.	Eglin Investments No. 41 (Pty) Ltd T/A Turbomeca Africa	58.	President Steyn Gold Mines (Free State) (Pty) Ltd
59.	UCG Recycling (Pty) Ltd *	60.	Randfontein Estates Limited (Elandskraal Section)
61.	Uhuru Transformers Refurbishment CC	62.	Richards Bay Iron and Titanium (Pty) Ltd
63.	Vic Ramos CC	64.	Sasol Chemical Industries Limited
65.	Weston Scrap Metal	66.	Simmer & Jack Mines Limited - Buffelsfontein Gold Mine (Buffelsfontein site)

Certificates of Registration			
67.	Ya-Rona Scrap Metals	68.	Simmer & Jack Mines Limited - Buffelsfontein Gold Mine (Hartebeestfontein site)
69.	Zestcor Foundries (Pty) Ltd	70.	South African Port Operations (Dry Bulk Terminal - Richards Bay a Division of Transnet Limited)
71.	Umicore SA (Pty) Ltd	72.	Steenkampskraal Monazite Mine (Pty) Ltd
73.	Vesuvius South Africa (Pty) Ltd	74.	Stilfontein Gold Mining Company Limited
75.	Waste Product Utilisation (Pty) Ltd	76.	Ticor SA (Pty) Ltd
77.	Eggerding SA (Pty) Ltd	78.	Village Main Reef Gold Mining Company Limited
79.	Fer-Min-Ore (Pty) Ltd (Zirtile Milling)	80.	West Witwatersrand Gold Mines Limited
81.	Geratech Zirconium Beneficiation Limited	82.	Transvaal Mining and Finance Company Limited
83.	Metrec	84.	Anglogold Ashanti Limited (West Wits Operations)
85.	GoldPlats Recovery Limited	86.	Anglogold Ashanti Limited (Vaal River Operations)
87.	Mintek	88.	African Rainbow Minerals Gold/Harmony Freegold Joint Venture Company (Pty) Ltd (Tshepong, Matjhabeng & Bambani Operations)
89.	Nuclear Fuels Corporation of SA (Pty) Ltd	90.	Uranium One Africa Limited and Micawber 397 (Pty) Ltd
91.	Rand Refinery Limited	92.	Harmony Gold Mining Company Limited (Randfontein Operations)
93.	African Rainbow Minerals Gold Limited (Orkney Operations)	94.	Harmony Gold Mining Company Limited (Free State Operations)
95.	African Rainbow Minerals Gold Limited (Welkom Operations)	96.	Placer Dome Western Areas Joint Venture
97.	Anglo Operations Limited (Namakwa Sands)	98.	Uramin-Mago-Lukisa JV Company (Pty) Limited
99.	Anglogold Ashanti Limited (Ergo Operations)	100.	INVAP S.E.

* Company registered name

4.6 *Independent Regulatory Verification of Radiological Environmental Analysis*

Verification and enforcement actions are important mechanisms used by the NNR as part of the compliance assurance programme to ensure the protection of the public, environment and property against nuclear damage. Independent verification analysis of samples collected around the regulated facilities is part of the NNR's compliance assurance programme.

A project to upgrade the NNR laboratory was initiated in the 2006/07 financial year and will continue into 2007/08. The feasibility study was completed, aimed at ensuring a sound basis for decision making on the best approach to strengthening the NNR's analytical verification capability.

Koeberg Nuclear Power Station

5

5.1 Background

Eskom operates the Koeberg Nuclear Power Station (KNPS), comprising two 900 megawatt electrical (MWe) pressurised water reactors (PWRs), on the Atlantic coast 40 kilometres north of Cape Town. The station was built by a French consortium, with Framatome being responsible for the nuclear island, Alsthom Atlantique for the conventional island, Spie Batignolles for the civil works and Framateg for the overall project co-ordination. The first Nuclear Licence, NL-1, was issued to Eskom for the construction of the power station, which commenced in 1976. The two units were brought into commercial operation in July 1984 and November 1985 respectively.

In terms of the NNR Act, nuclear installation licences contain conditions deemed necessary to ensure the protection of persons, property and the environment against nuclear damage. The current Koeberg Nuclear Installation Licence, NL-1 variation 16, contains 16 conditions, including specific licensing requirements and control pertaining to:

- Plant description and configuration
- Scope of activities that may be undertaken
- Maintenance and in-service inspection
- Effluent management
- Environmental monitoring
- Transport
- Quality management
- Reports
- Safety assessment
- Controls and limitations on operation
- Operational radiation protection
- Waste management
- Emergency planning and preparedness
- Physical security
- Acceptance and approval
- General

In terms of Section 26(2) of the NNR Act, Eskom, as the nuclear licence holder, implements an inspection programme to ensure compliance with the conditions of the Nuclear Installation Licence, NL-1. The NNR implements an independent system of compliance inspections to provide assurance of compliance with the conditions of the nuclear licence in terms of section 5(d) of the NNR Act. The regulatory approach to the licensing of nuclear installations such as KNPS is largely based on risk and the application of international safety standards and practices.

5.2 Occupational Exposure to Radiation

The worker doses at KNPS over the reporting period were within regulatory limits. (20 $mSva^{-1}$ averaged over five consecutive years and 50 $mSva^{-1}$ in any single year).

Radiation exposure of personnel working at KNPS is subject to control by the operational radiation protection programme. This programme ensures that control within the annual individual dose limit is achieved. In addition, the programme also serves to ensure that all doses are kept as low as reasonably achievable (ALARA).

The highest annual individual dose accrued during 2006 was 12.7 mSv (2005: 17.2 mSv). which compares favourably with the ALARA target of 4 mSv^{-1} The total annual collective dose to the workforce for the year was 1.6 person-Sv (2005: 2.3 person-Sv). The total annual collective dose to the workforce for the year was 1.6 person-Sv (2005: 2.3 person-Sv). The total occupationally exposed workforce during 2006 numbered 2 490, indicating an average annual individual dose of approximately 0.64 mSv (2005: approximately 0.9 mSv). The figure below illustrates the dose distribution arising from the individual exposures accrued from 2000 to 2006.

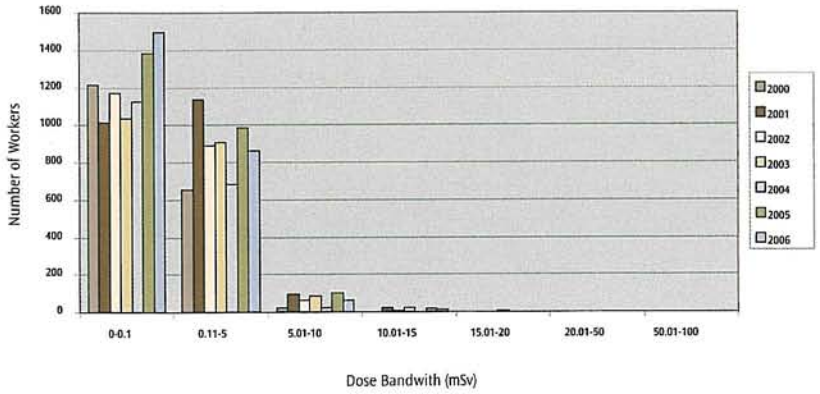


Figure 1: Occupational Exposure at Koeberg (2000-2006)

5.3 Public Exposure to Radiation

There were no safety concerns regarding the safety of the public living around KNPS during the reporting period.
In accordance with the conditions of licence and the Regulations on Safety Standards and Regulatory Practices (RSRP), published as Regulation No. R388 dated 28 April 2006, the public doses resulting from effluent discharges from the KNPS must comply with the dose limit of 0.25 $mSva^{-1}$ and the system of Annual Authorised Discharge Quantities (AADQs) applicable to the site.

KNPS complied with the AADQs and the projected public doses resulting from the effluent releases (both liquid and gaseous) were well within the dose limit for the 2006 calendar year. The projected dose to members of the public was calculated to be 0.004 $mSva^{-1}$, with liquid effluent contributing 0.0036 $mSva^{-1}$ and gaseous effluent contributing 0.0004 $mSva^{-1}$.

The following figure depicts the estimated public doses for the period 2001-2006.

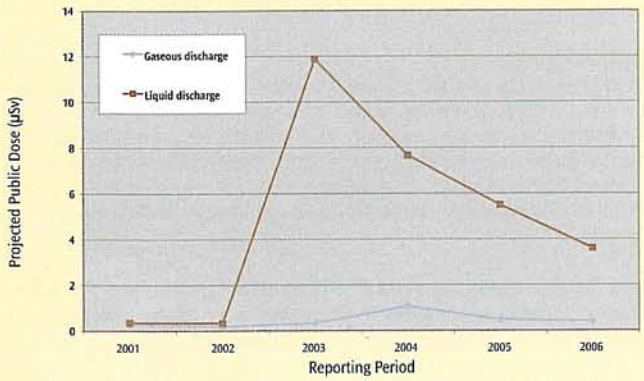


Figure 2: Projected Public Dose for Koeberg (2001-2006)

5.4 Nuclear Safety

As in previous years, a major part of the NNR's work in the area of nuclear safety related to in-depth safety assessments associated with KNPS. During this period the NNR focused its safety assessment activities primarily on the areas summarised below:

5.4.1 Plant Refuelling Outage Modifications

Safety assessments were conducted on submissions from Eskom relating to plant modifications and associated procedure changes, due for implementation during refuelling outage 116, to take place over the period August to October 2007. Twenty safety related modifications are scheduled for implementation during this outage, half of which relate to the continuation of the CP-1 alignment projects reported previously.

The NNR has enlisted the technical support of the French Regulator in conducting the above reviews.

5.4.2 Findings of the Koeberg First Periodic Review

In terms of the first Koeberg periodic review, reported on previously, although many corrective actions are at an advanced stage of completion, it is apparent that not all corrective actions will be concluded before the start of the second periodic review, which will commence in 2008. The delays relate to plant modifications as well as operating and equipment testing requirements which will significantly improve the safety of the plant. The NNR will continue to monitor the implementation of these projects.

5.4.3 Koeberg Second Periodic Review

The NNR entered into discussion with Eskom on the scope of the second Koeberg periodic review. The NNR regards this project as an effective way to evaluate the Koeberg plant design and operations against current international safety standards and practices.

The project will follow IAEA guidelines (NS-G2.10) and the scope will take into consideration safety improvements implemented in the French nuclear programme, referred to as "VD3 projects". The following areas are being considered for the scope of the review:

- Plant ageing and plant life extension;
- VD3 modifications scope;
- Severe accident modifications;
- Organisation and staffing; and
- Performance and operational experience feedback.

5.4.4 *Unit 1 Generator Failure*

In following up on the Unit 1 generator failure at Koeberg, which occurred on 25 December 2005 and was reported previously, the NNR assessed reports relating to the technical, administrative and security aspects of the event, including the following:

- The final report from Eskom on the technical causes of the generator failure, which indicated that although the initiation of the generator failure was attributed to the presence of foreign material (e.g. a bolt or similar item), Eskom's investigation was unable to conclusively determine the root cause. Numerous corrective actions were implemented to avoid recurrence in the future. The NNR conducted inspections on Unit 2 during the outage in May-June 2006 to verify that the corrective actions relating to foreign material exclusion are effective. The NNR is satisfied with the improvements made to this process, including additional training and oversight and will continue to monitor the process at future outages;
- The National Intelligence Agency (NIA) report on the investigation into administrative and security aspects relating to the presence of foreign material in the generator, which concluded that there was no evidence of a security breach in this regard; and
- The report confirming the adequacy of security at the Acacia Power Station.

5.4.5 *Containment Sump Clogging*

This matter, recognised internationally as a generic safety concern for many nuclear power plant designs, relates to the possibility of containment sump filters becoming clogged by debris created in the containment in the event of a loss of coolant accident (LOCA). The French regulatory authority, ASN, reported this matter at level 2 on the International Nuclear Event Scale (INES) for the French family of nuclear power reactors. Eskom has opted for a solution developed by AREVA for CP-1 plants similar to Koeberg. The detailed design of the new sump filters became available early in 2007 and is still under review within the NNR. The modification is scheduled for implementation on both Koeberg units, commencing with Unit 1, during outage 116 in August 2007.

As a short-term corrective measure, Eskom has adopted the new Westinghouse sump blockage control room guideline for Koeberg usage. This guideline, together with removal of the existing sump screens, has been reviewed and approved by the NNR as an interim procedural measure until the sumps have been modified.

5.4.6 *Koeberg Nuclear Fuel Management Strategy*

Spent fuel pool

The NNR assessed the final modification of an alternative spent fuel pool cooling system which would provide a completely independent third cooling system. The NNR commenced discussions with Eskom on the detailed specifications for the design of the cooling system, mode of operation and project implementation. Partial implementation of this modification will commence during outage 117.

New RFA 2 fuel

Eskom considered an alternative fuel supplier for Koeberg, and approached the NNR with a proposal to license Westinghouse RFA 2 type fuel and the corresponding fuel transport container for future reloads. The first full reload of the new fuel is planned for outage 118. Because this is a new supplier and a new type of fuel, Eskom will follow the agreed strategy to load eight Lead Use Assemblies (LUAs) per reload during outages 216, 117 and 217. These will enable Eskom to evaluate core compatibility with the current AREVA fuel and compatibility of fuel handling mechanisms and other equipment at Koeberg. The NNR began evaluating and assessing Eskom's initial documentation relevant to this proposal during the reporting period.

5.4.7 *Plant Condition Management*

The NNR monitors plant condition management at Koeberg through specialist meetings, assessment of safety submissions from Eskom, inspections and audits. The following were focus areas for plant condition management during the reporting period and into 2007:

- Steam generator integrity;
- Primary loop cast elbows;
- Nickel alloys and welds in the primary circuit;
- Reactor pressure vessel (RPV) integrity;
- Unit 1 vessel head replacement and reconciliation of US and French manufacturing codes;
- In-service Inspection Second Interval Programme;
- In-service Inspection Third Interval Programme;
- Risk-informed In-service Inspection;
- Non-destructive evaluation (NDE) inspection qualification;
- Power uprating; and
- Fuel cladding.

In-service Inspection (ISI) Third Interval
Eskom submitted initial documentation on the proposed risk-informed ISI approach to be used in the third interval at Koeberg. The NNR engaged in discussions with the French regulatory authority on the approach followed in France, with a view to revisiting the licensing requirements during the next reporting period.

Reactor Pressure Vessel (RPV) Head Replacement
The RPV head for Unit 1 is scheduled for replacement in outage 116. In preparation for this activity, two NNR inspectors observed the RPV head replacement process in one of the EdF plants, similar to Koeberg, in France. In addition, as part of the NNR safety oversight process, two NNR experts will perform an inspection at the RPV manufacturing facility in France and will witness pre-service inspections of the Koeberg RPV head manufactured there.

5.4.8 *Licensing of Koeberg Reactor Operators*

The biennial evaluation of Koeberg reactor operators is an integral part of the licensed operator re-qualification training and is designed to measure the effectiveness of the re-qualification training programme and to provide long-term maintenance of established standards. This measure is derived from a full scope assessment of individual and team skills and knowledge, and consists of written, walk-through and dynamic simulator evaluations.

The next biennial evaluations are scheduled for the third quarter of 2007.

The annual psychometric evaluations of operator licence holders by the NNR consultant were conducted during the first quarter of 2007. Preliminary results indicate an improvement in the overall health and safety culture compared to that which prevailed in the previous reporting period.

5.4.9 *Developments around Koeberg*

The NNR conducted quarterly meetings with the provincial and municipal authorities in the vicinity of Koeberg through the Nuclear Emergency Preparedness Regulatory Oversight Committee (NEPROC). The main focus of this forum is the enforcement of the NNR requirements, issued in respect of Regulation 287, in terms of development frameworks in the 16 km zone of Koeberg which could ultimately lead to an additional population of approximately 300 000 people living within this zone. The NNR received a formal submission from the authorities for review and acceptance. The submissions included the following:

- Traffic/Evacuation Model;
- Independent review of the traffic/evacuation model;
- Criteria for assessment and control of developments; and
- Process for approval of developments.

The above-mentioned development frameworks are on hold until the NNR has accepted their processes.

5.5 *Transport Safety*

There were no safety concerns involving the transport of radioactive material in 2006.

The following table indicates the number of shipments of nuclear fuel to Koeberg, and low and intermediate level radioactive waste from Koeberg to Vaalputs.

Table 4: Consignments in 2006

Consignments	*Number 2006/07*	*Number 2005/06*
Fuel consignments on site	1	2
Radioactive waste consignments to Vaalputs	60	18
Other materials (sealed sources) acquired during 2006	0	3

5.6 *Radioactive Waste Safety*

There were no safety concerns involving radioactive waste during the period under review.

Liquid radioactive waste released to the sea during 2006 totalled a volume of 9 360 m3. The quantity of solid radioactive waste produced and drummed is indicated in the table following:

Protection Foundation

Table 5: Inventory of Solid Radioactive Waste Produced and Drummed

Type of solid radioactive waste	*Number of drums 2006/07*	*Number of drums 2005/06*
C1 drums containing non-compressible waste	16	29
C1 drums containing concentrates	85	66
C1 drums containing resin	0	47
C2 drums containing resin	0	27
C4 drums containing filters	6	3
C2F drums containing filters	3	7
210 litre metal drums containing general trash	471	423
210 litre metal drums containing resin	184	132

The South African Nuclear Energy Corporation (Necsa) performed an audit at KNPS in November 2006, on the effectiveness and suitability of the quality management system and requirements applicable to radioactive waste. Discrepancies were identified between the Koeberg and Vaalputs inventory figures and these are currently being investigated.

5.7 Environmental Protection

There were no safety concerns regarding the environment around KNPS during the reporting period.

The Koeberg Environmental Surveillance Programme, involving sampling and analysis of representative environmental media, is performed to verify that effective control has been maintained over effluent discharges. In addition a widespread network of Environmental Thermo-Luminescent Dosimeters (TLDs) around Koeberg monitors the external exposure to active gaseous effluents from Koeberg.

The results of the 2006 environmental surveillance programme do not indicate any significant increase in the levels of radioactivity in environmental samples over pre-operational levels, with the exception of marine and sewage sludge samples, which contain traces of radionuclides derived from Koeberg. These trace quantities included Co-60 and Cs-137. The detection of activation and fission products in sewage sludge from plants close to nuclear power stations is a common occurrence worldwide. These nuclides are released to the sewage works via the plant sewage system.

The presence of I-131 was detected throughout the year. Investigation proved that this was as a result of nuclear medicine usage and not from the power plant.

5.8 Nuclear Emergency Planning and Preparedness

Overall, the integrated Koeberg Nuclear Emergency Plan is viable, but there are matters that Eskom was required to rectify. The NNR is satisfied that Eskom and supporting organisations are adequately prepared to manage emergency situations.

The evaluation of Koeberg's emergency preparedness and response is based on the following elements:

- Emergency Exercises – NNR and holder emergency exercises;
- Audit/Surveillance Activities; and
- Review and Assessment Activities.

5.8.1 NNR Emergency Exercise

The NNR emergency exercise for KNPS was conducted on 15 February 2006. The aim was to test the response of both the on-site and off-site organisations to a simulated nuclear emergency.

The NNR concluded, from the overall response of Eskom and the intervening organisations, that the Integrated Koeberg Nuclear Emergency Plan is viable, however some areas for improvement were identified including the following:

- The involvement of national government in dealing with emergency situations;
- Assessment of recommended protective actions;
- Communication with special populations;
- Shift change-over at City of Cape Town Disaster Operations Centre;
- Updating the status boards to accommodate late phase data;
- Zeroing of the Quartz Fibre Dosimeter (QFD) in some locations;
- Ensuring that the latest Koeberg maps are used; and
- The recurrence of findings at some of the locations.

Eskom was required to ensure that appropriate corrective actions were implemented. The NNR tracked the close-out of findings by Eskom and intervening organisations through liaison meetings and by means of formal communication with Eskom. Specifically, reviews were performed by the NNR for every proposed corrective action, followed by discussions and inspections where necessary. Compared to previous years, a downward trend in the number of findings/observations was noted, and in terms of the grading of findings, no significant findings were recorded that would require immediate action. Approximately 90% of the findings have been reviewed and closed out by the NNR and the remaining corrective actions are expected to be completed by June 2007.

5.8.2 *Koeberg Annual Internal Emergency Exercise*

A Koeberg programme of six drills and an internal exercise, including the participation of intervening organisations, was undertaken during the reporting period.

The objectives and ground rules for these exercises were determined using previous NNR and Eskom exercise reports, as well as any specific areas that may have required testing due to the introduction of recent changes. This proved successful, and many previous shortcomings were resolved and confirmed to have been rectified in the exercise. Shortcomings that still existed (e.g. mustering and electronic information transfer) were highlighted for correction.

This series of exercises provided an opportunity to train and authorise new staff in several different positions within the emergency plan. As a result, many new staff members attained authorisation following their successful participation. Notable improvements were observed, particularly in the Emergency Controller, Administration Officer and support functions such as Plotters, Messengers, Communications Officers, Regional Team Members and Technical Support Centre (TSC) support staff.

5.8.3 *Inspection Activities*

As part of assessing the adequacy of the KNPS nuclear emergency preparedness and response arrangements, an inspection was performed by the NNR on Eskom licensing documentation and audit reports during February 2007.

The NNR inspection specifically focussed on compliance with requirements in the following areas related to emergency preparedness and response:

- Roles and Responsibilities;
- Plans and procedures;
- Training of personnel;
- Interface with other role-players; and
- Change management.

Based on the inspection of the Eskom documentation, the team concluded that there was overall compliance with regulatory standards and requirements, and arrangements for emergency preparedness and response can be regarded as adequate.

5.9 Physical Security

There were no concerns with respect to physical security at KNPS during the reporting period.

The licensing requirements pertaining to physical security, with which Eskom must comply, are contained in Condition 12 of the Koeberg Nuclear Licence NL-1 variation 16. This condition specifically refers to a security standard which was developed by Eskom in consultation with the security establishment in South Africa. The NNR accepted the standard, and compliance with it is effectively included in the licence conditions. As part of its compliance assurance programme, the NNR conducts regular inspections at Koeberg to verify conformance to this standard. The NNR is presently in discussion with various government agencies involved in oversight of National Key Points for assistance in terms of technical reviews of security related submissions from licensees. The NNR approved a revised security standard developed by Eskom which formed the basis for the security upgrade at Koeberg.

5.10 Safety of Sealed Radioactive Sources

No safety concerns were raised with regard to sealed radioactive sources.

The safety of sealed radioactive sources, which falls under the jurisdiction of the NNR, is included in the compliance assurance programme.

5.11 Nuclear Incidents/Accidents Reported

The NNR was satisfied that the processes implemented at Koeberg relating to incidents/occurrences are acceptable and that plant safety performance was acceptable.

The NNR monitors incidents/occurrences at Koeberg in the following manner:

- Audits conducted on the Eskom processes relating to occurrences (i.e. plant monitoring, reporting, follow-up and close-out);
- Monitoring of the implementation of these processes;
- Monthly meetings between Eskom and the NNR at which experience feedback is discussed;
- Review of Eskom reports on experience feedback and safety indicators, which reflect occurrences and trending thereof; and
- Direct assessment of selected significant occurrences.

These are reported to the NNR in the form of a problem notification. A total of 472 Problem Notifications (PNs) (occurrences) were reported in the following categories:

Table 6: Problem Notification/Occurrences

Category	*Number of incidents/occurrences*
1. (Notify the NNR immediately)	0
2. (Notify the NNR within 24 hrs)	2
3. (Notify the NNR within 5 working days)	470

None of these PNs were classified as nuclear incidents or accidents as defined in the NNR Act.

The reporting and follow-up of problems, occurrences and events at Koeberg represents a thorough, fully procedurised and ongoing process of investigation. The duration of a given investigation until final close-out may vary from a few weeks to several months, depending upon the complexity of the issues involved.

International events were monitored by Eskom and the NNR. Eskom monitored information from sources such as the World Association of Nuclear Operators (WANO), International Nuclear Power Operations (INPO), the IAEA and Electricite de France (EdF). Apart from monitoring Eskom processes in this regard, the NNR also monitored information from the IAEA and information exchanged with other regulatory bodies through bilateral agreements.

5.12 *Regulatory Compliance*

5.12.1 *Compliance Assurance Programme*

In order to verify the degree of compliance with the conditions of authorisation, the NNR undertakes independent inspections and audits. For the year under review a total of 320 inspections were conducted in 30 process areas.

5.12.2 *Safety Culture*

In response to the Nuclear Safety Culture survey that was conducted during 2006 several of the survey recommendations were implemented with appropriate actions taken by management. The most salient of these are the following:

- Five feedback sessions on the survey were given to plant staff;
- The concept of Nuclear Awareness Seminars was revived and two sessions were held;
- A suite of documents was compiled with respect to nuclear safety;
- The Safety, Health and Environment Policy was revised and now includes the WANO safety culture guideline principles; and
- Management visibility and engagement of staff members currently receive more attention.

A further Nuclear Safety Culture survey is planned for the next reporting period.

5.12.3 *Maintenance*

As indicated in previous reports, the NNR conducted an inspection on the maintenance function at Koeberg during outage 215 which was linked to the Unit 1 generator failure. The report indicates the following:

- Inadequate compliance with procedures in various areas;
- Inadequate planning and communication between maintenance sections; and
- Inadequate progress in corrective actions arising from findings relative to previous outages.

These matters were taken up with Eskom to identify and implement appropriate corrective actions. Eskom has since implemented corrective actions, including a new procedure for maintenance of sensitive equipment, based on local and international best practice.

5.12.4 *Safety Indicators*

A safety indicator system is used by the NNR to record and grade findings arising from the compliance assurance programme, inspections and assessment activities. The regulatory concerns are ranked according to a colour-coded system in terms of their severity with:

Colour Code	**Ranking**
Red	unacceptable;
Orange	tolerably high;
Yellow	tolerably medium;
Blue	tolerably low; and
Green	below regulatory concern.

The main findings of the compliance assurance programme were recorded and are summarised below:
Red: (None)

Orange (Eight findings covering the following aspects):

- Close-out of periodic review findings (refer to section 5.4.2);
- Bases for abnormal operations;
- Instances of non-compliance with operating technical specifications;
- Control of maintenance and in-service inspection activities; and
- KRT Radiation Monitoring System.

Bases for abnormal operation
During the reporting period Eskom submitted a revised suite of shutdown procedures.

Non-compliance with operating technical specifications (OTS)
The NNR is reviewing Eskom's suite of corrective actions to address recent non-compliances with the OTS. These actions include disciplinary action, improvements to procedures and retraining of operators.

Control of In-service Inspection (ISI) Activities
The NNR identified anomalies in the implementation of the ISI programme by Koeberg, which were due mainly to problems with their electronic scheduling system. Eskom is presently implementing corrective actions.

KRT (Radiation Monitoring System)
Frequent problems with this system have occurred over the reporting period. The NNR is monitoring Eskom's corrective actions.

The above indicators reflect several areas of substandard performance relating to modifications, general operating rules and implementation thereof, rather than any specific violation of licence conditions. However as these factors could in the long-term undermine safety if left unchecked, the NNR will continue to closely monitor these areas and assess the effectiveness of Eskom's implementation of corrective actions.

5.13 Regulatory Warnings or Directives to Stop Work

The following table details the directive issued by the NNR during the reporting period:

Table 7: Directives issued to KNPS

No.	*Description*
1.	Suspension of five reactor operator licences for failure to comply with operating technical specifications as required by conditions of the Koeberg Nuclear Installation Licence, NL-1.

5.14 Competency and Sufficiency of Eskom's Workforce to Work Safely

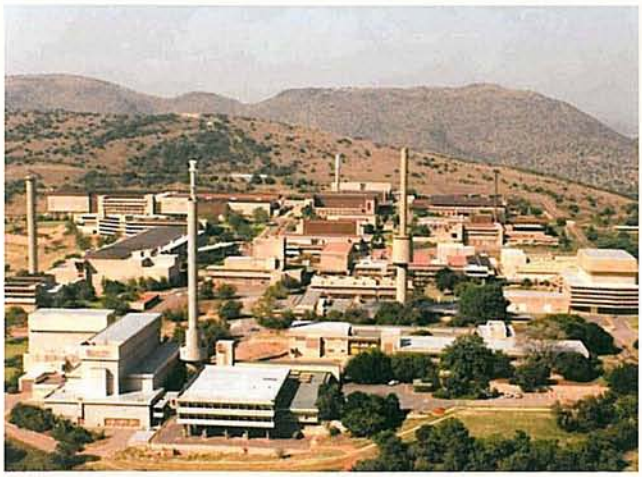
In accordance with statutory requirements, Eskom reported on its staffing and competency levels for the reporting period, including problems encountered and the skills development and retention strategy to address them. Eskom has indicated problems with high turnover of staff, particularly with regard to engineers, technicians, physicists and project managers. Presently the competency index indicates low coverage in Plant Engineering, Nuclear Engineering and Maintenance. The NNR however is satisfied that all safety related work is performed by competent individuals. However, as this issue has the potential to impact on nuclear safety in the long run, the NNR will continue to monitor staffing and competency levels at Koeberg.

5.15 Appeals to the Chief Executive Officer

No appeals were lodged during the review period.

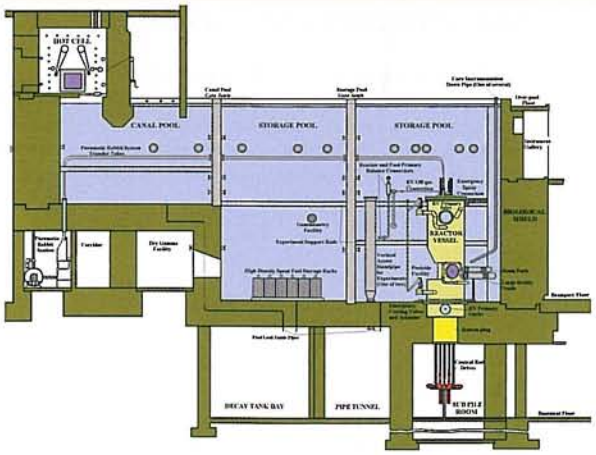
South African Nuclear Energy Corporation (Necsa) – Pelindaba Site

6









6.1 Background

Established as a public company in terms of the Nuclear Energy Act (Act No. 46 of 1999) the South African Nuclear Energy Corporation (Necsa), headquartered on the Pelindaba site, is wholly owned by the state. The Pelindaba site, comprising 658 hectares of land and 54 hectares of buildings and other improvements, is situated in the magisterial district of Madibeng in the North-West Province, approximately 25 km west of Pretoria and 55 km north-west of Johannesburg.

The main functions of Necsa are to undertake and promote research and development in the field of nuclear energy and related technologies; to process and store nuclear material and other restricted material; and to co-ordinate with other organisations in matters falling within these spheres.

Necsa supplies a wide range of high-technology products and services to South African and foreign market sectors, with the SAFARI-1 research reactor as the cornerstone of the commercial isotope production programme.

In accordance with the conditions of licence, Necsa was required to ensure that arrangements, acceptable to the NNR, were established and implemented with respect to the following aspects:

- Plant description and configuration
- Scope of activities that may be undertaken
- Maintenance and in-service inspection
- Effluent management
- Environmental monitoring
- Transport
- Quality management
- Decommissioning
- Records
- Medical surveillance
- Reports
- Safety assessment
- Controls and limitations on operation
- Operational radiation protection
- Waste management
- Emergency planning and preparedness
- Physical security
- Acceptance and approval
- Organisational change
- Modifications
- Radioactive waste management
- General

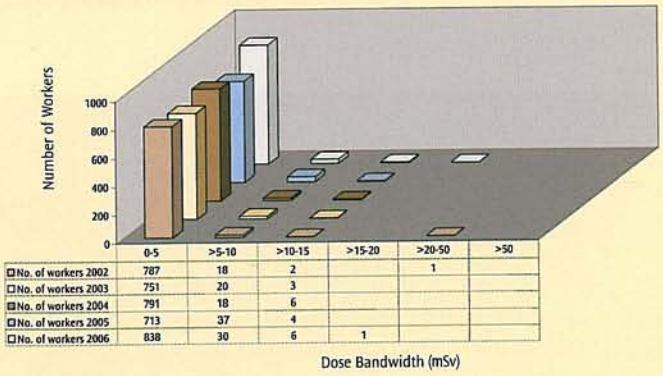
6.2 Occupational Exposure to Radiation

The worker doses at Pelindaba over the reporting period were within regulatory limits.

Radiation exposure of personnel working at Pelindaba is subject to control by the operational radiation protection programme. This programme ensures that control within the annual individual dose limit is achieved. In addition, the programme also serves to ensure that all doses are kept as low as reasonably achievable (ALARA).

The average effective radiation dose to occupationally exposed workers was 0.63 mSv, for the 2006 calendar year, which was within the regulatory limit. The maximum cumulative dose accrued for an individual worker in the calendar year was 15.6 mSv and the total collective dose for the 875 radiation workers was 0.6 Person-Sv. Over the reporting period Necsa demonstrated compliance with the dose limitation system for individual workers.

The following figure details the occupational exposure for the past five years.



	0-5	>5-10	>10-15	>15-20	>20-50	>50
No. of workers 2002	787	18	2		1	
No. of workers 2003	751	20	3			
No. of workers 2004	791	18	6			
No. of workers 2005	713	37	4			
No. of workers 2006	838	30	6	1		

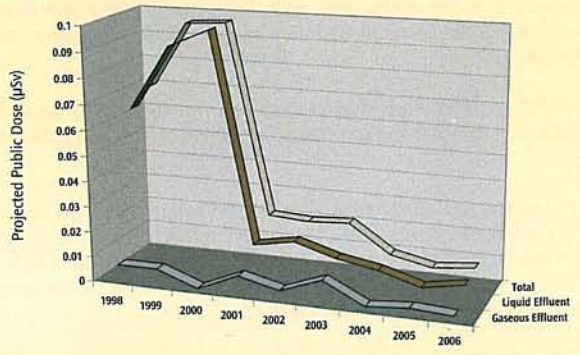
Figure 3: Occupational Exposure at Necsa (2002-2006)

6.3 Public Exposure to Radiation

There were no safety concerns regarding the safety of the public living around Pelindaba during the reporting period.

In accordance with the conditions of licence and the Regulations on Safety Standards and Regulatory Practices (RSRP), published as Regulation No. R388 dated 28 April 2006, the public doses resulting from effluent discharges from the Necsa Pelindaba site must comply with the dose limit of 0.25 $mSva^{-1}$ and the system of Annual Authorised Discharge Quantities (AADQs) applicable to the site.

Necsa complied with the AADQs and the projected public doses resulting from the effluent releases (both liquid and gaseous) were well within the dose limit for the 2006 calendar year. The projected dose to members of the public was calculated to be 0.008 $mSva^{-1}$, with the liquid effluent contributing 0.007 $mSva^{-1}$ and the gaseous effluent contributing 0.001 $mSva^{-1}$. The following figure shows the estimated public doses for the period 1998 to 2006.



	1998	1999	2000	2001	2002	2003	2004	2005	2006
Gaseous Effluent	0.00593	0.00614	0.000004	0.007	0.003	0.009	0.00073	0.0021	0.00102
Liquid Effluent	0.06453	0.08997	0.097	0.014	0.017	0.012	0.00913	0.0041	0.00698
Total	0.07	0.09611	0.097	0.021	0.02	0.021	0.00987	0.0063	0.008

Figure 4: Projected Public Dose for Necsa (1999 - 2006)

6.4 Nuclear Safety

As in previous years, a major part of the NNR's work in the area of nuclear safety related to in-depth safety assessments associated with authorised Necsa facilities. During this period the NNR focused its safety assessment activities primarily on the areas summarised below:

6.4.1 Process Based Licensing

Further progress was made with the application of Process Based Licensing (PBL) at Necsa run facilities, which commenced in the 2002/03 financial year. In terms of PBL the responsibility for technical details relating to nuclear safety is more clearly placed in the hands of the authorisation holder and more emphasis is placed on the licence holder to ensure that appropriate processes are in place to comply with the regulatory requirements. These processes include:

- Identification of applicable fundamental nuclear and radiological safety standards;
- Identification of the basis for authorisation, change control in respect of modification, processes to update and maintain safety case and relevant operational programmes;
- Identification of nuclear and radiological safety requirements necessary to underpin the safety case and processes needed to maintain these in line with the safety case; and
- Monitoring and enforcement of compliance with the requirements identified.

The approach adopted by the NNR was to set high level standards (dose, risk criteria and conformance to international norms) and to allow the authorisation holder the freedom to adopt a design basis and operating practices which are appropriate for the plant and then justify the choice in terms of NNR standards. Once accepted by the NNR, the intent of the authorisation would effectively be to hold the authorisation holder to its provisions and commitments. The regulator would then monitor the implementation of these processes through surveillances, inspections, audits, etc.

Once completed the Necsa PBL system will comprise 204 Necsa designed processes/systems developed in accordance with the following table:

Table 8: Necsa PBL System

Document Series Number	*Category*	*Number of Documents Planned*
SHEQ-INS-0000 Series	Policy and General	14
SHEQ-INS-0200 Series	Quality Management System	20
SHEQ-INS-0800 Series	Project Management Process	15
SHEQ-INS-0860 Series	Safety Assessment	20
SHEQ-INS-1000 Series	Premises and Housekeeping	6
SHEQ-INS-2000 Series	Mechanical, Electrical and Personal Protection/Safeguarding	23
SHEQ-INS-3000 Series	Fire Prevention and Protection and Emergency Planning	6
SHEQ-INS-4000 Series	Compliance Assurance Process	10
SHEQ-INS-5000 Series	Safety Organisation	14
SHEQ-INS-6000 Series	Environmental Management	4
SHEQ-INS-7000 Series	Hazardous Chemical Substances Control Programme	14
SHEQ-INS-8000 Series	Radiation Protection Programme	37
SHEQ-INS-8900 Series	Facility Security	14
SHEQ-INS-9000 Series	Behaviour Based Safety (BSS) Process	7

6.4.2 LEU Conversion for SAFARI-1 Fuel

SAFARI-1 is a tank-in-pool type, light-water-moderated and cooled, beryllium and water reflected research reactor, designed and built as a general research tool, falling into the class of research reactors commonly known as Material Test Reactors (MTR).

SAFARI-1 is designed to accommodate a wide variety of irradiation experiments for medical, industrial and research applications. The reactor vessel is located in the reactor pool, which is surrounded by a high-density concrete biological (radiation-absorbing) shield. This provides the necessary shielding for operations from above the core and at poolside facilities whilst the reactor is in operation.

The reactor is currently fuelled by Highly Enriched Uranium (HEU) contained in modified MTR-type fuel elements. It uses light water for coolant and neutron moderation purposes and is currently licensed to operate at a maximum thermal power level of 20 MW.

In line with international trends and nuclear non-proliferation, Necsa sought approval from the Department of Minerals and Energy (DME) for the conversion of the SAFARI-1 Research Reactor to Low Enriched Uranium (LEU) fuel. Following receipt of approval in 2005, Necsa purchased two LEU fuel elements from Cerca in France for irradiation tests. These elements were irradiated in SAFARI-1 during the review period and the data collected will be used as part of the safety case to be developed and submitted to the NNR for approval of the conversion of the reactor to LEU fuel.

6.5 Transport Safety

There were no safety concerns related to the transport of radioactive material during the reporting period.

The conditions of licence require that the transportation of radioactive material or any equipment or objects contaminated with radioactive material must be carried out in compliance with the relevant provisions of the IAEA's Regulations for the Safe Transport of Radioactive Material, 1996 Edition (Revised), Safety Standard Series No. TS-R-1 (ST-1, Revised), IAEA, Vienna, 2000.

Transport actions undertaken during the reporting period included the following:

- Import of LEU fuel plates from Cerca in France;
- Import of LEU (oxide) from Russia;
- Export of sources; and
- Transport of calibration sources between Necsa's Vaalputs and Pelindaba sites.

During the reporting period, the NNR reviewed four requests for the approval or validation of transport containers.

6.6 Radioactive Waste Safety

There were no safety concerns regarding radioactive waste management at Necsa during the reporting period.

In accordance with the conditions of licence, Necsa is obliged to:

- Establish and implement arrangements for the minimisation and safe management of radioactive waste on the site; and
- Establish, implement and maintain a radioactive waste management programme for each facility on the site, in order to:
  - Ensure the identification, quantification, characterisation and classification of any radioactive waste generated;
  - Provide for the necessary steps leading to safe clearance, authorised discharge, disposal, reuse or recycling; and
  - Provide for the safe storage of radioactive waste between any waste management processes.

The following are some of the primary principles that apply to the management of solid radioactive waste on the Necsa Pelindaba site:

- Waste Management is aimed at optimisation of the processes from waste generation to waste disposal;
- The responsibility for solid waste management with respect to the development of facility-specific programmes, application of standards, quality assurance, optimisation and compliance with waste acceptance requirements is vested with the waste generator;
- All waste generated and processed on the Necsa site shall, after completion of the relevant predisposal activities, be channelled via a single gate-keeping entity (the Nuclear Liabilities Management Department [NLM]) for further predisposal activities (as applicable) followed by either long-term storage or disposal; and
- The waste generator is responsible for waste up to the point at which it has been formally transferred and accepted by NLM.

6.6.1 Waste Stored at Necsa's Pelstore Facility

Pelstore is the centralised storage facility for radioactive waste on the Pelindaba site. During the 2006 calendar year a total of 3 868 radioactive waste containers were transferred to the Pelstore. The total number of radioactive waste containers within the Pelstore, as at 31 December 2006, was 44 861.

The following table reflects the radioactive waste received at the Pelstore during the reporting period:

Table 9: Waste Accrued and Stored at Pelstore in 2006/07

Waste Type	*Waste Container Capacity*	*Number of Containers*
Isotope Waste	4 ton	31
Medical Waste	160 ℓ	2
Solidified Waste	100 ℓ	360
Compressible Waste	160 ℓ	2256
Non-Compressible Waste	160 ℓ	1219

6.6.2 Waste Stored at Facilities other than the Pelstore

The quantities of waste stored at other facilities on the Pelindaba site is 13 989 drums.

6.7 Environmental Protection

There were no concerns regarding safety to the environment around Pelindaba in the reporting period.

Further to the monitoring and control of effluent discharges, Necsa is required to institute an environmental monitoring programme to ensure that discharges do not result in environmental build-up of radioactivity.

Samples were collected from various sample media in the environment around the Pelindaba site. The sampling locations were based on the surrounding land use. Samples were analysed and results were submitted to the NNR on a quarterly and annual basis. The sample media included:

- Air filter monitoring on the Pelindaba site;
- Milk from surrounding farms;
- Plant material in the surrounding area; as well as
- Water and fish samples from the Crocodile River and Hartbeespoort Dam.

The NNR employs a system of reporting levels, investigation levels and intervention levels to ensure an appropriate level of control and detection of radioactivity in the environment. The system is designed to rapidly detect any increases in environmental radioactivity and to ensure that appropriate action is taken to rectify the situation.

6.8 Nuclear Emergency Planning and Preparedness

The overall response of Necsa and the intervening organisations showed that the Nuclear Emergency Plan was viable; however areas for improvement were identified.

In order to ensure effectiveness of the Necsa's preparedness and response arrangements with respect to nuclear emergencies, the NNR performed audits and arranged an emergency exercise during which the response to a given scenario is tested. To actively involve stakeholders, the NNR invited a number of stakeholders to participate as observers.

The scenario involved a gaseous release from the research reactor with off-site consequences. The scenario required Necsa to precipitate protective actions beyond the Necsa site boundary. These actions included activation of off-site functionaries to assist in managing the consequences of the 'release'. On-site, activation procedures and processes, equipment and personnel were tested. Off-site, primarily communication arrangements were tested.

Evaluation of the exercise against the specific objectives revealed the following:

- The emergency response functionaries on- and off-site were activated too long after the 'site emergency' was declared in the reactor building. This caused a delay in all expected responses;
- Communication and actions of Necsa functionaries were generally performed in accordance with procedures;
- Communication with the off-site emergency support functions was in accordance with procedures even though initial notification with Madibeng Disaster Management was delayed;
- Several deficiencies were identified with regard to the emergency preparedness and response capability of Madibeng Disaster Management;
- Control of access of the public to the Flora Park Region (including the Broederstroom Primary School) was acceptably performed;
- The exercise tested emergency conduct and safety awareness of Necsa personnel. Some workers and visitors on-site during the emergency did not understand the implication of the emergency announcements and were not properly mustered. Therefore the emergency conduct and safety awareness of Necsa personnel in general needed to be improved;
- The turn-back dose limits for emergency workers were complied with; however a situation arose when the QFD of the Field Team at Point 32 went off-scale. The Field Team was sent to the Medical Station and the second team was dispatched;
- Communication arrangements with a pre-arranged hospital were properly performed and the 'injured' patient was sent to Kalafong Hospital; and
- Traffic co-ordination arrangements between Madibeng and Gauteng Province were demonstrated and Tshwane Metro was also represented at the Madibeng Disaster Management Centre.

Following the exercise Necsa was required to ensure that appropriate corrective actions were implemented. The NNR continues to monitor the implementation of the corrective actions by Necsa.

6.9 Physical Security

No security breaches were experienced and there were no safety concerns regarding physical security at Necsa during the reporting period.

Necsa is required to put in place physical security measures to prevent, as far as reasonably possible, unauthorised access to sites or diversion, theft or removal of radioactive material that does not meet the requirements of clearance.

Upgrading of the security systems on the Necsa site, as well as the upgrading of the security systems for the individual nuclear facilities in line with the directives issued to Necsa, were implemented. Progress reports on these upgrades were submitted to the NNR on a two weekly basis. Some of the longer-term actions as a result of the security audit conducted by the NNR in December 2005 continued to be monitored and will be reported in the next annual report.

In the review period, 17 new security-related procedures/documents were developed as part of PBL. The approval of these procedures will be undertaken in the next reporting period.

6.10 Safety of Sealed Radioactive Sources

There were no safety concerns regarding sealed radioactive sources at Pelindaba during the reporting period.



In accordance with the conditions of licence Necsa was required to maintain a register of all radioactive sources on the site. The radioactive source register must, as a minimum, detail the following information:

- Nuclear facility in which the source(s) were located;
- Name of person responsible for the source;
- Radionuclide or radionuclide composition;
- Original activity;
- Identification number;
- Reference date (date produced);
- Form of the source (e.g. sealed source, anodised disk, solution, powder, etc);
- Company or facility of origin;
- Location or storage space;
- Date transferred; and
- Details of company or facility transferred to.

The radioactive source register is submitted to the NNR annually at the end of the calendar year and Necsa provides a status report twice a year (March and September).

6.11 Nuclear Incidents/Accidents Reported

The NNR was satisfied that the processes implemented at Necsa relating to incidents/occurrences were acceptable and that plant safety performance was acceptable.

The PBL documents, SHEQ-INS-4140 and SHEQ-INS-4141 titled "Categorisation and Reporting of SHEQ Related Events" and "Investigation and Close-out of SHEQ Related Events" respectively were reviewed and agreed during the reporting period. Category one events are reported to the NNR on a quarterly basis, category two events are reported within twenty-four hours of the occurrence of the event while category three events are reported within one hour of the occurrence of the event.

A total of 44 category 2 events and 7 category 3 nuclear events were reported during the financial year. None of these events represented a nuclear accident or nuclear incident as defined in the RSRP and all the events had an INES rating of 0.

6.12 Regulatory Compliance

6.12.1 Compliance Assurance Programme

In order to verify the degree of compliance with the condition of authorisation, the NNR undertakes independent inspections and audits of Necsa facilities.

For the year under review a total of 708 planned inspections were conducted in 10 technical areas. The inspections showed compliance with the NNR requirements and conditions of licence. In addition a total of 48 unplanned inspections were undertaken in response to occurrences reported to the NNR.

During the reporting period the NNR conducted three audits. These audits were related to Emergency Planning and Preparedness, the Pelstore and the Hotcell Complex (Building P1701). In general, the audits observed compliance with the conditions of licence.

6.12.2 Safety Culture Audit

The NNR directed that Necsa provide the status of the organisation's safety culture in meeting the requirement of the RSRP and conditions of licence. Necsa was required to commission an organisation-wide safety culture audit and implement the necessary corrective actions as identified in the audit. This audit was to be conducted by an organisation independent of Necsa. In the commissioning of this audit, the NNR was to be kept informed and the contracted organisation was to be agreed upon with the NNR.

The audit will be undertaken in the next financial year and the report is expected to be submitted to the NNR by October 2007.

6.13 Regulatory Warnings or Directives to Stop Work

The following table details directives issued to Necsa by the NNR over the reporting period:

Table 10: Regulatory Directives issued to Necsa

No.	*Description*
1.	Following the reporting of the suspected loss of a small quantity of HEU material from the Beva E-1 laboratory, Necsa was directed to suspend activities in Beva E-1 laboratories and in Building P2700 until such time as otherwise directed by the NNR.
2.	In response to Necsa's verbal notification (provided at 19H50 on 20 December 2006) of the shutdown of the SAFARI-1 Research Reactor following the failure of the primary demineralisation system, the NNR ordered that the research reactor remain shutdown until conditions for return to power were met.

6.14 Competency and Sufficiency of Necsa's Workforce to Work Safely

In addition to the requirements in the RSRP, the conditions of licence require that Necsa must establish and implement arrangements to ensure that only suitably qualified and experienced persons perform any duties which may affect the safety of operations on the site, or any duties assigned by or under the conditions of licence. Such arrangements must make provision for the appointment, as appropriate, of duly authorised persons to control and supervise operations, which may affect plant or facility safety.

Necsa generally complies with the above requirements but it was noted that some additional capacity is required, particularly in the area of safety case development. Following the events related to material accounting in Building P2700 and the Beva E1 laboratory, Necsa was required to review the competency of all staff in both these facilities.

6.15 Appeals to the Chief Executive Officer

No appeals were lodged during the reporting period.

6.16 Appeals to the Minister

The NNR issued the revised Necsa Nuclear Installation Licence, NL-27, variation 26. The main reasons for issuing a new variation were:

- The need to give effect to the name change of the authorisation holder from "Atomic Energy Corporation" to "South African Nuclear Energy Corporation";
- General revision of the Licence to better define the scope of authorised activities;
- The need to more clearly define the NNR requirements taking into account international experience and stakeholder feedback; and
- To progress the application of Process Based Licensing at facilities run by Necsa.

The issuing of the licence was the subject of an appeal, by Necsa, to the Minister of Minerals and Energy, on the grounds that the issue of a site licence was contrary to the provisions of the NNR Act.

In accordance with the provisions of section 45(3) of the NNR Act, regarding an appeal to the Minister against a decision of the NNR Board, after considering the grounds of appeal and the Board's reasons for the decision, the Minister must, as soon as practicable:

(a) Confirm, set aside or vary the decision; or
(b) Substitute any other decision for the decision of the Board.

The Minister's decision is expected in the next reporting period.



South African Nuclear Energy Corporation (Necsa) – Vaalputs Site

7









7.1 Background

Vaalputs, the National Radioactive Waste Disposal Facility, is situated in the Northern Cape Province, approximately 90 km south-east of Springbok, which is the closest town, and 200 km from the Namibian border. It is located on the western edge of the Bushmanland Plateau, and extends some way into the Kamiesberg, which forms part of the Namaqualand rocky hills. The farm, Vaalputs, covers an area of approximately 10 000 ha, and the disposal site is situated in the western half and is 99.54 ha (900 m x 1 106 m) in extent, including a 200 m exclusion zone along the perimeter, in which waste disposal is not permitted.

Vaalputs went through a detailed screening, selection and characterisation process and a nuclear installation licence for the disposal of radioactive waste at Vaalputs was granted in February 1990 (Nuclear Installation Licence NL-28).

7.2 Occupational Exposure to Radiation

The worker doses at Vaalputs over the reporting period were within regulatory limits.

Radiation exposure of personnel working at Necsa is subject to control by the operational radiation protection programme. This programme ensures that control within the annual individual dose limit is achieved. In addition, the programme also serves to ensure that all doses are kept as low as reasonably achievable (ALARA).



Figure 5: Location of Vaalputs in Relation to Pelindaba (Necsa) and the Koeberg Nuclear Power Station

Vaalputs demonstrated control over occupational exposure of the workers, in line with the NNR requirements. The average effective radiation dose per occupationally exposed worker for the calendar year 2006 was 0.64 mSv and the total collective dose was 0.008 Person-Sv. The maximum cumulative dose accrued for an individual in the calendar year was 1.0 mSv. The figure below shows the range of worker doses for the last 6 years.

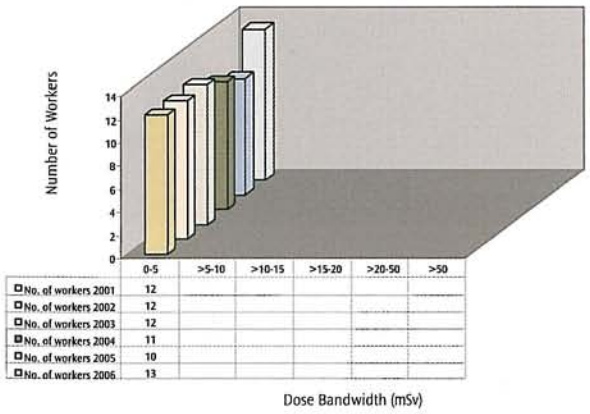


Figure 6: Occupational Exposure at Vaalputs (2001-2006)

7.3 *Public Exposure to Radiation*

There was no safety concern regarding public exposure to radiation.

In accordance with the conditions of licence and the Regulations on Safety Standards and Regulatory Practices (RSRP), published as Regulation No. R388 dated 28 April 2006, the public doses resulting from effluent discharges from Vaalputs must comply with the dose limit of 0.25 $mSva^{-1}$.

The environmental surveillance programme for Vaalputs has shown no measurable radiological impact on the public living around Vaalputs.

7.4 *Nuclear Safety*

Aftercare of capped trenches is performed on a continuous basis. Aftercare inspections include, amongst others, monitoring the trenches for cracks in the cap, as well as burrower activity or sagging of the cap.

In open trenches the trench walls are inspected by a professional engineer to verify their safety and waste packages are backfilled with screened clay within the time periods specified by the NNR to limit environmental effects on the waste packages.

The application of PBL at Necsa's Pelindaba site was extended to include operations at Vaalputs and the same processes applicable at Pelindaba were implemented at Vaalputs.

A revised post-closure safety assessment and a safety analysis report for Vaalputs is scheduled to be submitted to the Regulator for review during the next reporting period.

7.5 Transport Safety

There were no safety concerns regarding transport safety at Vaalputs during the reporting period.

Transport of waste to the Vaalputs site is the responsibility of the waste generator and is regulated by the NNR. The Vaalputs waste acceptance criteria require that such transport be performed in compliance with the relevant provisions of the IAEA regulations for the safe transport of radioactive material. On arrival at Vaalputs the disposal operator verifies by inspection that these requirements have been complied with, as well as the general condition of the transport vehicle and its driver.

Only suitably qualified and appointed Vaalputs personnel are allowed to operate motorised equipment transporting waste containers on the site and to perform tasks related to the waste disposal activities.

7.6 Radioactive Waste Safety

There were no safety concerns regarding radioactive waste safety at Vaalputs during the reporting period.

During the reporting period 60 shipments, consisting of 1 332 radioactive waste packages, were received at Vaalputs from Koeberg for final disposal. Pre-shipment inspections were performed by Vaalputs personnel before shipment approval was considered, to ensure that only physically sound waste containers arrived at Vaalputs.

The table following summarises the types of packages disposed of during the reporting period:

Table 11: Packages Disposed of at Vaalputs During the Reporting Period

Type of Packages	*Number of Drums*	*Number of Shipments*
Concrete Drums	253	51
Metal Drums	1 079	9
Total	**1 332**	**60**

The Vaalputs nuclide inventory, including the number of waste packages in each trench, as on 31 December 2006, is summarised in the following table:

Table 12: Vaalputs Nuclide Inventory

Trench	*Number of Waste Packages*	*Total Activity Received and Decayed up to 31 December 2005*	
		Total Activity Received to date (GBq)	**Total Activity Corrected for Decay (GBq)**
A01	9 920	1.91 E +05	1.11 E +05
A02	840	4.070 E + 02	1.65 E +02
A03	1 639	8.534 E +02	6.30 E +02
B01	3 177	1.02 E +05	3.26 E +04
Total	**15576**	**2.905 E +05**	**1.44 E +05**

7.7 Environmental Protection

There were no concerns regarding the safety of the environment at Vaalputs during the reporting period.

Vaalputs implemented a routine environmental monitoring programme on and around the Vaalputs facility. This programme was conducted to confirm that there were no releases from the Vaalputs site resulting in build-up of radioactivity in the environment. Because the evaporation rate in the area is considerably higher than the precipitation rate, the monitoring programme is focused on borehole water, soil and vegetation in the area.

Most of the nuclides were below the lower level of detection of the analytical equipment. Detectable concentrations, mainly uranium, alpha and beta activities were from natural radioactivity.

7.8 Nuclear Emergency Planning and Preparedness

There were no safety concerns regarding the emergency planning and preparedness at Vaalputs during the reporting period.

The facility has an emergency team which is trained and equipped to perform the necessary functions during an emergency situation.

Vaalputs conducted an emergency exercise and four mustering exercises during the reporting period. There were no deficiencies or non-compliances identified.

7.9 Physical Security

There were no safety concerns relating to physical security at Vaalputs during the reporting period.

In accordance with the conditions of licence, Vaalputs has established physical security arrangements to prevent unauthorised access to the site or diversion, theft or removal of radioactive material from the site.

Necsa reviewed the physical security arrangements at Vaalputs and improvements are planned for the next reporting period.

7.10 Safety of Sealed Radioactive Sources

There were no safety concerns relating to sealed radioactive sources at Vaalputs during the reporting period.

Sealed radioactive sources on the Vaalputs site were mainly test and calibration sources, used to calibrate radiological protection instruments. These sources were stored in accordance with approved procedures.

7.11 Nuclear Incidents/Accidents Reported

The NNR was satisfied that the processes implemented at Vaalputs relating to incidents/occurrences are acceptable and that plant safety performance was acceptable.

No nuclear events, nuclear incidents or nuclear accidents were reported at Vaalputs during the reporting period.

7.12 Regulatory Compliance

7.12.1 Compliance Assurance Programme

NNR inspections undertaken at Vaalputs during the reporting period indicated compliance with the Vaalputs licence conditions. However, during the audit conducted on the facility by the NNR, a number of findings were reported to Vaalputs with instructions for the facility to correct these during the 2007/8 financial year.

A total of 16 inspections were planned and carried out at Vaalputs. The following table reflects details on the number of inspections and the inspection discipline.

Table 13: Details of Inspections Conducted at Vaalputs

Inspection Discipline	*Number of Inspections*
Engineering, maintenance and in-service inspection	4
Operational Technical Specifications	2
Radiation Protection – Workers	3
Radiation Protection – Public	3
Waste management	2
Quality assurance	1
Security	1
Total	**16**

7.13 Regulatory Warnings or Directives to Stop Work

No regulatory warnings or directives to stop work were issued during the reporting period.

7.14 Competency and Sufficiency of the Vaalputs Workforce to Work Safely

In addition to the requirements in the RSRP, the conditions of licence require that Vaalputs establish and implement arrangements to ensure that only suitably qualified and experienced persons perform any duties, which may affect the safety of operations on the site, or any duties assigned by or under the conditions of licence. The arrangements make provision for the appointment, as appropriate, of duly authorised persons to control and supervise operations, which may affect plant or facility safety.

Vaalputs generally complied with the above requirements but it was noted that some additional capacity was required, particularly in the area of safety case development and Radiation Protection (RP) oversight. The deficiency in RP expertise was addressed through the provision of RP oversight by Necsa corporate.

7.15 Appeals to the Chief Executive Officer

No appeals were lodged during the review period.

Regulation of Natural Sources

8

8.1 Background

Mining and mineral processing facilities which handle naturally occurring radioactive material (NORM) require authorisation in terms of the National Nuclear Regulator Act (Act No. 47 of 1999). In terms of section 22 (1) of the NNR Act such facilities are authorised by means of a certificate of registration (COR).

These facilities include those of:

- Producers of minerals such as copper, gold, uranium, heavy minerals and phosphate rock;
- Service providers who are authorised for the cleanup of sites contaminated with NORM residue;
- Scrap recyclers who are involved in the business of processing and selling of scrap material such as ferrous and non-ferrous metal, plastic or stainless steel which have been contaminated with NORM residue from the mining processes; and
- Small users where laboratories and pilot plants are used to test small quantities of NORM samples to verify the viability of proposed mining projects, for example.

The NNR at present issues six types of COR namely:

- Mining and mineral processing facilities;
- Scrap smelters;
- Fertiliser manufacturers;
- Scrap processors;
- Small users; and
- Service providers.

A typical COR covers the following authorisation conditions:

- Operational Radiation Protection;
- Radioactive Waste;
- Transportation;
- Physical Security;
- Hazard Assessment;
- Operational Limitations;
- Requirements for Occurrences; and
- Quality Management.

The NNR implemented an independent system of compliance assurance inspections, audits, monitoring, and the review of reports in order to provide regulatory oversight in accordance with the conditions of the nuclear authorisations.

8.2 Occupational Exposure to Radiation

The NNR continued to focus much of its regulatory effort on mines, particularly those where the potential exists for workers to be exposed to radiation levels in excess of the annual dose limit.

The table below reflects the progress in reducing the number of workers that were exposed to radiation levels in excess of the dose limit.

Table 14: Number of Mine Workers Exposed above the Dose Limit

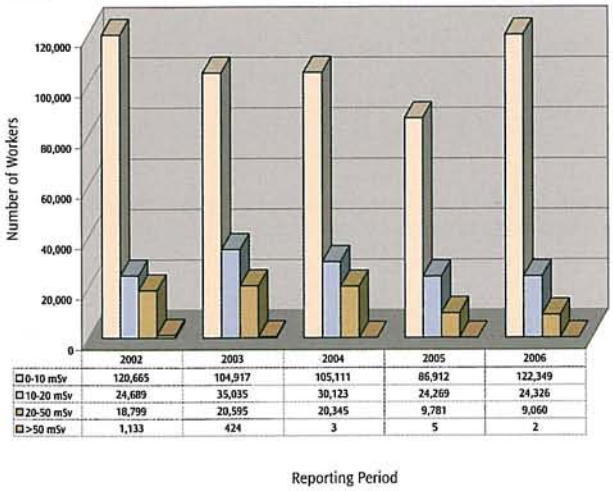
Year	*Number of Workers*
2001	7 931
2002	1 133
2003	424
2004	3
2005	5
2006	2

One of the factors contributing to the improvement is the implementation of more rigorous compliance assurance measures by the NNR at these mines. More frequent inspections were conducted and working groups (comprising the NNR, Mine Health and Safety Inspectorate and worker representatives) were established to monitor progress with the action plans developed by the mines to reduce occupational exposures. These action plans included the identification and implementation of engineering controls and the use of action levels to remove workers from high exposure areas.

During the reporting period, two workers were exposed to doses in excess of the annual dose limit. They were relocated to areas where they would not be further occupationally exposed to radiation. The worker's occupational health was then monitored in the light of the exposure that they received.

The NNR continues to monitor the implemented measures to reduce worker doses.

The graph below compares the distribution of radiation doses to workers, as reported by holders in their annual dose reports for the calendar years 2002 to 2006.



	2002	2003	2004	2005	2006
0-10 mSv	120,665	104,917	105,111	86,912	122,349
10-20 mSv	24,689	35,035	30,123	24,269	24,326
20-50 mSv	18,799	20,595	20,345	9,781	9,060
>50 mSv	1,133	424	3	5	2

Figure 7: Occupational Exposure (2002-2006)

8.3 *Public Exposure to Radiation*

In accordance with the Regulations on Safety Standards and Regulatory Practices, Regulation No. R388, dated 28 April 2006 (RSRP), the public doses for members of the public must comply with the action specific dose limit and a limit of 1 $mSva^{-1}$ in terms of all authorised actions. The NNR further required that holders submit Public Safety Assessments (PSAs) and Public Radiation Protection Programmes (PRPPs) to ensure that authorised actions do not pose any undue health risk to members of the public.

These documents were reviewed and accepted for implementation. The projected public exposures from authorised actions were all within the public dose limit.

8.4 *Transport Safety*

There were no safety concerns related to transport during the reporting period.

Routine transport of low specific activity (LSA-1) scrap materials takes place on a daily basis between authorised facilities. The transportation of NORM and NORM contaminated scrap was carried out in accordance with the requirements of the NNR.

8.5 *Radioactive Waste Safety*

There were no safety concerns related to radioactive waste safety during the reporting period.

Authorisation holders were required to manage their radioactive waste and associated waste products. Accordingly section 1.5 of the COR required that a waste management procedure be submitted to demonstrate compliance with NNR requirements.

The main aspects of a typical radioactive waste management procedure include:

- Identification of radioactive waste and its sources;
- Segregation of radioactive waste into process and non-process waste;
- Categorisation of process waste into homogeneous and non-homogeneous waste;
- Radioactive waste management options;
- Record keeping and reporting; and
- Quality Assurance.

Routine and annual waste management reports were submitted to the NNR, summarising and interpreting the above programme and demonstrating compliance with the NNR requirements.

8.6 *Environmental Protection*

Following concern over potential environmental impacts, due to mining activity in the Wonderfontein Catchment Area (WCA), the NNR initiated a study to determine the radiological impact of mine discharges in the WCA. This is reported on in more detail in section 11.1 of this report.

The NNR required the holders to establish, implement and maintain an environmental monitoring and surveillance programme, as outlined in the RSRP, to ensure and verify that the radioactive effluent discharged by the holders, complied with the conditions of nuclear authorisation.

These programmes were based on the Public Hazard Assessment reports and included among other things, the monitoring strategy, site specific factors, spatial and temporal variations and population distribution.

8.6.1 *Contaminated Sites*

During the reporting period the NNR made progress in the review of the cleanup, remediation and release from regulatory control of previously contaminated sites.

Initially 38 radioactive contaminated sites were identified for cleanup and remediation. During 2006/07 an additional 15 radioactive contaminated sites were identified. Of the 53 radioactive contaminated sites, 51 were cleaned and 31 were inspected by the NNR during 2006/07 and will be released from regulatory control in the next financial year. The remaining 20 cleaned sites and the outstanding two radioactive contaminated sites will be inspected and cleaned respectively during the 2007/08 financial year.

8.7 Nuclear Emergency Planning and Preparedness

There were no safety concerns related to nuclear emergency planning and preparedness during the reporting period.

The NNR required that an emergency and preparedness plan, be established to make provision for any occurrence involving radioactive material which has the potential to give rise to unplanned exposure to radiation in excess of the respective annual dose limits for workers, visitors to the site, or members of the public. The scope and application of this procedure was mainly limited to the transportation of NORM such as Ammonium DiUrinate as in the case of NUFCOR.

8.8 Physical Security

In general, COR holders demonstrated compliance with physical security requirements. However, in the case of Anglo Gold Ashanti-Ergo Operations, significant non-compliances were identified and a directive was issued to the holder in September 2006. The holder responded by addressing the non-compliances raised, after which the moratorium that had been placed on the operations was lifted.

As part of the conditions of a nuclear authorisation, the holders of a nuclear authorisation are required to establish, implement and maintain a physical security system that is approved by the NNR. Such a system is designed to prevent, as far as reasonably possible, unauthorised access to areas containing radioactive material and to prevent the unauthorised removal, diversion or theft of such material.

8.9 Safety of Sealed Radioactive Sources

There are no sealed radioactive sources regulated by the NNR at holders of certificates of registration. The safety and regulation of such radioactive sealed sources falls within the jurisdiction of the Directorate Radiation Control under the Department of Health.

8.10 Nuclear Incidents/Accidents Reported

The NNR is satisfied that the processes implemented in terms of actions relating to incidents/occurrences are acceptable and that plant safety performance was acceptable.

Holders reported a total of 26 occurrences to the NNR of which eight related to the potential to exceed the dose limit for workers.

No nuclear incidents or nuclear accidents, as defined in the NNR Act, were reported during the period.

8.11 Regulatory Compliance

8.11.1 *Compliance Assurance Programme*

In order to verify the degree of compliance with the condition of authorisation, the NNR undertakes independent inspections and audits at authorised facilities.

A total of 127 inspections were conducted during the reporting period. These inspections were conducted to verify the degree of compliance with the various programmes and procedures implemented by the holders and were focused on those mines where worker doses could be exceeded or where uranium and acid plants were being demolished. The average compliance index for inspections was 81%.

Holders were required to investigate the reasons for, and implement corrective actions related to, all non-compliances identified.

A total of 21 audits were conducted at various mining facilities, to ascertain the degree to which these mines were implementing quality management systems. The audit findings concluded that the mines were deficient in terms of the requirements related to quality management systems.

The mines were required to submit and implement action plans addressing corrective and preventive actions. The NNR will continue to monitor the implementation of the corrective and preventive measures during the next reporting period.

8.12 Regulatory Warnings and Directives to Stop Work

The following regulatory warnings and directives to stop work were issued to holders of COR:

- On 11 August 2006, the NNR directed Gravellotte Mines Limited to immediately cease all operations. The holder had failed to comply with two directives sent previously, which outlined the need to institute procedures to protect the workforce and the public from the hazards of radiation. NNR inspectors had established that underground workers were not adequately monitored and subsequently two workers at this mine were exposed to doses in excess of the annual dose limit. The mine was required to make immediate use of the services of a radiation protection specialist and to implement control measures to ensure that workers were not over exposed to the radiation hazards of radon gas. The level of risk to workers is considered unacceptable when the annual dose to the worker could be exceeded within the year. The mine was allowed to commence with operations after all the NNR requirements were complied with;
- Anglo Gold Ashanti-Ergo Operations was issued with a directive on 13 September 2006, following failure of the holder to implement proper physical security procedures to protect members of the public from access to radioactive contaminated scrap, as well as for the unauthorised release of radioactive contaminated scrap materials to members of the public without implementing adequate and proper procedures. The holder responded by addressing the non-compliances raised, after which the moratorium that had been placed on the operations was lifted;
- A regulatory warning was issued to Mine Workers Recycling Services on 5 October 2006 for failure to implement their Radiation Protection Programme and Radiation Protection Function and failure to submit their routine waste and dose reports.
- Following the identification of major non-compliance, regarding safety assessments to ensure the protection of the public as well as requirements to protect the workforce, during an inspection; the NNR directed Omnia Fertilisers to cease all operations on 5 October 2006. On inspection by an NNR inspector, several major non-compliances were found. The facility was not permitted to continue with operations until all the non-compliance issues were addressed; and
- On 5 October 2006, the NNR directed President Steyn Gold mine to cease all operations, due to its continued failure to comply with the requirements related to the protection of workers from exposure to radiation. Following the implementation of corrective actions approved by the NNR, the mine was allowed to resume operations.

8.13 Competency and Sufficiency of the Operator Workforce to Work Safely

From the inspections and audits conducted, the NNR concluded that the holders of nuclear authorisations demonstrated compliance with the requirements related to competency and sufficiency of the operator workforce to work safely.

The NNR requires holders to demonstrate that they have adequate competent, qualified and trained staff to execute the radiation protection function and to maintain an appropriate safety culture. As a minimum, the staffing of the operator workforce consists of the Radiation Protection Specialist (RPS), Radiation Protection Officer ((RPO) – an officer certified by the NNR who is responsible for the operational radiation protection programme of a NORM facility), Radiation Protection Monitor ((RPM) – an officer who assists the RPO with basic functions of radiation protection such as monitoring) and a Ventilation Officer (if applicable). The RSRP also requires that the radiation protection function be sufficiently independent and that it is consulted on all decisions which may have an impact on radiation protection or nuclear safety.

8.14 Appeals to the Chief Executive Officer

Harmony Gold Mine lodged an appeal with the CEO of the NNR in terms of section 43(1) of the NNR Act (Act No. 47 of 1999). The appeal was lodged against the decision of the NNR to turn down the application for the use of waste rock for residential or construction purposes. The waste rock was within the scope of authorisation of Harmony's Evander and Welkom operations. On his decision of appeal, the CEO substituted the inspector's decision by approving the release of waste rock for construction of roads and other civil structures other than constructions which could result in the build-up of radon such as, but not limited to, residential dwellings and offices.



9.1 *Proposed Pebble Bed Modular Reactor (PBMR)*

The proposed PBMR is graphite moderated, helium cooled reactor using a direct gas cycle to convert heat, generated by nuclear fission in the reactor (pebble bed reactor core type design) and transferred to the coolant gas, into electrical energy by means of a helium turbo-generator. The NNR has proactively reviewed aspects of High Temperature Gas Cooled Reactor (HTGR) technology since 1999, in anticipation of the PBMR nuclear installation licence application of 2000.

For the Safety Case and Design Process of the PBMR Demonstration Power Plant, the current status is dominated by:

- Efforts to resolve the outstanding Key Licensing Safety Issues (KLIs) defining the major challenges to safety for the PBMR; and
- The screening review and the workshops on draft Safety Analysis Report (SAR) chapters and supporting documents forming the major part of the PBMR Safety Case for licensing.

Delays in resolving deliverables associated with the above have led to the postponement by Eskom of the formal submission of the Safety Case.

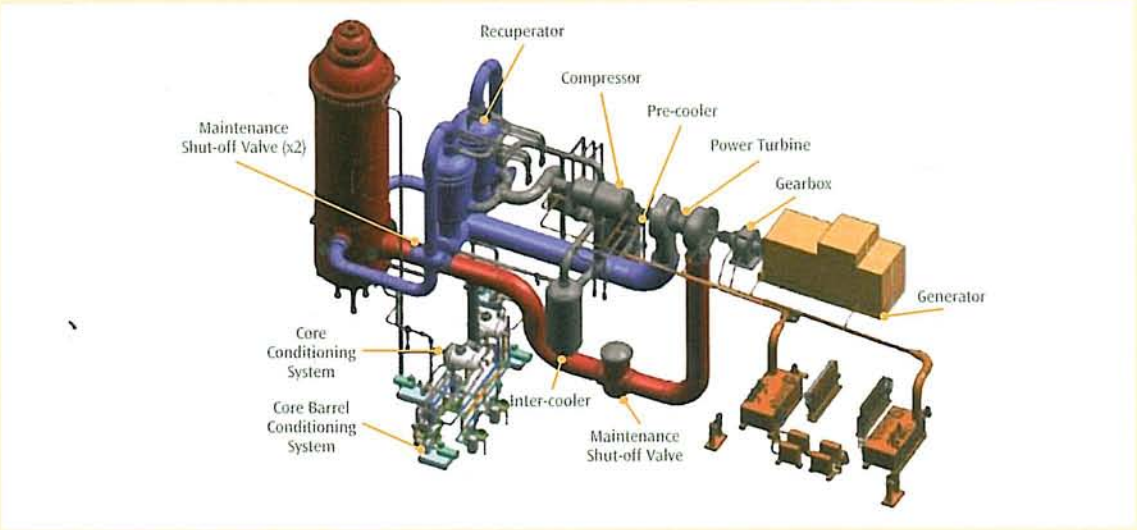


Figure 8: Pebble Bed Modular Reactor Main Power System Layout

For the first stage of licensing, Eskom applied for a construction licence. For this stage, (which does not pose a nuclear hazard since no nuclear fuel is permitted on site) it is important that the NNR is provided with sufficient information to assess whether the proposed design meets the licensing requirements and that all safety issues identified during the review of the SAR will be satisfactorily addressed at the appropriate stage of the licensing process. This will enable the NNR to formulate its position to pronounce on the initial nuclear installation licence.

During the NNR review process of the safety submissions 25 Key Licensing Issues (KLIs) and specific safety issues underpinning these KLIs were identified, which require resolution at various stages of the licensing of the PBMR. A process was been put in place between Eskom, PBMR (Pty) Ltd and the NNR for the resolution that involves the use of 10 expert working groups. Most of the issues must be addressed in SAR Rev 2 in support of a licence authorising construction. The strategies for the resolution of the 25 KLIs, developed by the PBMR (Pty) Ltd and Eskom, were accepted by the NNR. The implementation of these strategies, towards the resolution of the KLIs, is progressing.

The compilation of the SAR Rev 2 by PBMR (Pty) Ltd and Eskom involved early intervention workshops with the NNR staff with the objective of familiarising the NNR with the contents of the revised SAR and providing opportunities for the NNR to intervene at an early stage, to provide guidance where necessary and to ensure the adequacy of the document in terms of overall scope and content. It is envisaged that this process will maximise the quality of the final document and optimise the review period once the SAR Rev 2 is officially submitted to the NNR.

The issuing of the nuclear installation licence for the proposed PBMR Demonstration Power Plant will be subject to finalisation of the NNR's public hearing process in accordance with the NNR Act, and the NNR's satisfactory assessment of the SAR.

9.1.1 *Regulatory Warnings and Directives to Stop Work*

Suspension of Manufacturing Activities

The NNR became aware in September 2006 that certain activities important to safety and relating to the manufacturing of components had commenced without the necessary regulatory control. As a result, the NNR was unable to perform its regulatory function over the processes, as mandated by the NNR Act. The NNR took immediate steps to ensure compliance by directing PBMR (Pty) Ltd, through Eskom, to suspend all activities related to the manufacturing of these components until Eskom, as the licence applicant, and PBMR (Pty) Ltd had provided the necessary information to allow the NNR to exercise appropriate regulatory control. The NNR was also concerned about Eskom's lack of oversight over PBMR (Pty) Ltd as is expected of a licence applicant.

Eskom indicated in writing to the NNR that all manufacturing activities important to safety had been suspended and the NNR directed Eskom to ensure that manufacturing activities for all components of high and medium safety significance remain suspended until such time that:

- The NNR is satisfied that appropriate corrective actions arising from the investigation to be undertaken by Eskom have been accepted and implemented;
- Appropriate processes have been agreed upon by the NNR;
- The necessary monitoring programmes are completed; and
- The relevant technical documents have been submitted by Eskom/PBMR (Pty) Ltd and have been reviewed and accepted by the NNR.

The conditions for lifting the suspension had not been met at the time of compiling this report.

9.2 PBMR Fuel Plant

In July 2005, PBMR (Pty) Ltd and Necsa informed the NNR that the PBMR Company wished to apply for a nuclear installation licence for the prospective siting, construction, operation, decontamination and decommissioning of a PBMR Fuel Manufacturing Plant, for the manufacturing of nuclear fuel spheres as well as non-fuel graphite spheres for the proposed PBMR demonstration unit and for the associated transport of fuel fabrication material and fuel spheres. On 28 July 2005, Necsa wrote to the NNR withdrawing its original application, made in June 2000. At that time no public hearings had been held due to delays on the part of Necsa, in the finalisation of the required safety case.

On 19 July 2006, PBMR (Pty) Ltd submitted its revised Licence application, dated 17 July 2006.

A workshop between the NNR and the PBMR Fuel Manufacturing Plant took place in June 2006. The aim of the workshop was to clarify all regulatory requirements for the PBMR Fuel Manufacturing Plant, and to agree on the licensing framework and the communication process to be followed as well as the requirements for the public hearing process.

The workshop was attended by the NNR, PBMR Fuel, delegates from the PBMR Reactor Group and the consultants employed by the PBMR Company. The way forward and the working groups to participate in all the PBMR Fuel submissions were agreed. The issues identified for clarity during the workshop were formulated as an action list which is monitored by the NNR.

The NNR awaits the submission of the safety case for the proposed PBMR Fuel Manufacturing Plant from PBMR (Pty) Ltd.

In accordance with the requirements of section 21(3), notice of the PBMR (Pty) Ltd application was published in the Government Gazette of 29 September 2006, and local newspapers, calling for public comment. At the end of the period for public comment the NNR had not received any comments from the public. The NNR Board however resolved, in line with its previous decision, to hold public hearings for the proposed project subject to the applicant submitting an acceptable safety case to the NNR.

9.3 Proposed Production Smelter at Necsa

Originating from Necsa's previous operations, approximately 14 000 tons of uranium-contaminated scrap metal is presently stored on the Pelindaba site. The greater portion of this metal consists of about 36 000 separation elements which, in accordance with non-proliferation agreements, should be destroyed completely. Necsa regards smelting as the most appropriate and cost-effective method to achieve this.

In February 2001 Necsa submitted an application for a nuclear installation licence for a production smelter. In terms of the provisions of section 21(3) of the National Nuclear Regulator Act (Act No. 47 of 1999) the licence application was published in the Government Gazette and local newspapers. Further copies of the application were served on identified government departments, local and provincial authorities, community based organisations, organised labour groups, environmental groups, and chambers of business and commerce.

The above-mentioned bodies were granted a period of 30 days to make comment on the licence application. Following a review of the comments received, the NNR Board, in terms of section 21(4) of the NNR Act, determined a need for further public debate. Subsequently Necsa informed the NNR that the project would be delayed and no further review work was undertaken.

Towards the latter part of 2006 Necsa informed the NNR that it wished to proceed with the project. The NNR is currently reviewing the submitted safety case. The issuing of the nuclear licence for the proposed smelter will be subject to the NNR evaluation of the associated safety case and the finalisation of the NNR public hearing process.

Development of Regulatory Documents

10

The following regulatory documents were developed during the reporting period:

10.1 NNR Regulatory Philosophy and Practices

The NNR regulatory philosophy and practices document was finalised. The document provides information on how the NNR conducts regulatory oversight and also describes the approaches used for various actions.

10.2 Research Reactor Core Conversion

The NNR considered that the conversion of a reactor core from the use of highly enriched uranium fuel to the use of low enriched uranium fuel represents a major modification to the installation. Under such conditions, Necsa was required to submit to the NNR the corresponding safety case for its authorisation.

The NNR produced a technical document to provide practical guidance on how to fulfil the fundamental safety requirements and licensing criteria established by the NNR for safe operation of SAFARI-1. The document is based on requirements detailed in the current Necsa licence as well as other licence documents referenced therein. The document also incorporates experience from other countries which have undertaken core conversion projects.

The document therefore provides adequate confidence in the information through which assurance is maintained that the SAFARI-1 core conversion project will not result in Necsa exceeding any safety limits specified by the NNR for the safeguarding of workers, the public and the environment. The guide document is intended for use by the NNR staff involved in the safety review of the SAFARI-1 core conversion project.

10.3 Plant Life Extension

In order to inform a proactive approach to Plant Life Extension, the NNR developed a position paper that presents key issues related to the management of aging nuclear installations.

The report provides an overview on the topic, addressing the crucial issue of the licensing of the plant for extended plant operation. Various aspects pertaining to the Koeberg Plant that could impact on the safe operation of the plant during extended operation beyond the design lifetime, the degradation of the plant due to ageing and repair or replacement are addressed in the report.

The NNR continued to play an oversight role in the Koeberg Ageing Management programme, carried out within the framework of its regulatory compliance assurance programme.

10.4 Optimal Reduction of Radioactive Waste

The NNR developed a draft document on the NNR strategy for the minimisation of radioactive waste. The review and finalisation of this document will be progressed during the 2007/08 financial year. The review of the document is intended, among other things, to ensure alignment of NNR strategies with the "Radioactive Waste Management Policy and Strategy for the Republic of South Africa, 2005" that was published by the Department of Minerals and Energy.

10.5 Safety and Security of Radioactive Sources

This document was developed to provide direction in terms of the necessary regulatory approach, systems and processes for the effective regulatory control of safety and security of radioactive sources at sites under NNR regulatory control.

10.6 Requirements on Decommissioning

The requirements on decommissioning document complements the NNR safety standards and regulatory practices by providing further details on the NNR's requirements in terms of decommissioning for applicants or holders of authorisations, to satisfy the NNR safety goals. As part of the consultative process, the document will be submitted to the authorisation holders/licensees for comment before its approval.

Investigations and Regulatory Research

11

An important element of the regulatory strategy of the NNR is to proactively implement processes to improve its regulatory effectiveness. One of the means to achieve this goal is the establishment and implementation of a programme of regulatory research.

As part of the strategic and operational planning process regulatory research initiatives are identified and prioritised. The NNR does not undertake in-depth fundamental research, as carried out for example by specialised research centres, universities etc. Instead, research is focused on the regulatory research of selected topics to support regulatory oversight. Typically, the regulatory research activities of the NNR on selected initiatives include the review and survey of international literature, safety standards and regulatory practices with a view to informing NNR regulatory strategies, the development of new or the updating of existing regulatory requirements and the formulation of regulatory positions.

The funding for the regulatory research programme is derived from the overall NNR budget and currently amounts to approximately 3% of the total budget.

Some of the regulatory research initiatives undertaken by the NNR are indicated below:

11.1 Wonderfonteinspruit Project

Several gold mines surrounding the Wonderfonteinspruit Catchment Area (WCA) discharge liquid effluents into the environment. The released effluent could result in radioactive contamination that poses a radiological hazard to the public and environment of WCA. For this reason, the NNR conducted an independent study to determine the radiological impact of the mine water discharges to members of the public living around the WCA.

The potential radiological risks in the WCA are as a consequence of current mine water discharges and diffuse emissions of seepage and runoff from slimes dams, as well as legacies of past radioactive emissions, now present in sediments of water storage dams and in soils of contaminated floodplains.

The NNR report documenting the results and conclusion of this independent study will be made available in the next reporting period.

11.2 Project on Clean-up of Uranium-contaminated Sites in the Karoo

In the late 1970s and early 1980s, several companies undertook uranium prospecting in the Karoo area. These activities left the sites contaminated with uranium ore which can pose a radiological hazard to members of public and to future generations. During the last reporting period it was planned to have these sites rehabilitated.

The resurgence in uranium prospecting over the last year and the subsequent issue of prospecting permits by the DME has resulted in the NNR discontinuing the proposed rehabilitation of the four sites in the Karoo region.

The companies issued with these DME prospecting permits will be assigned the responsibility for clean-up. The NNR will ensure that the prospectors intending to undertake work on these sites are authorised. This will ensure the protection of the workers, public and the environment.

11.3 Radon Survey at the Cango Caves

The NNR progressed with the study, initiated in the previous reporting period, relating to radon exposures in the Cango Caves near Oudtshoorn. The purpose of the study was to determine the levels of exposure of tour guides, who spend a relatively longer time in the caves than other individuals, and to establish whether the NNR should consider authorising the caves to ensure the protection of the guides.

The study indicates that authorisation of the caves is warranted and the NNR will approach the Cango Caves early in the next reporting period to request an application for a certificate of registration.

11.4 Financial Liability Project

Section 29 of the National Nuclear Regulator Act (Act No. 47 of 1999) requires that the holder of a nuclear installation licence provides Financial Security and Liability for Nuclear Damage. The ongoing financial liability project provides the basis for

recommendations to the Minister of Minerals and Energy by the Board of the level of security to be provided. Work undertaken in 2006/07 progressed to a point where a preliminary report was compiled and is under review.

The project is divided into Phase I dealing with Koeberg and Phase II covering Necsa. The NNR has identified the need for further information to finalise Phase I of the project. It is envisaged that this work will be completed during the 2007/08 financial year. During Phase II the methodologies developed during Phase I will be adapted for application to the Necsa facilities.

11.5 Protection of the Environment against Nuclear Damage

The main objective of activities related to environmental protection is to ensure that licensed facilities and their operations do not cause adverse impacts on the environment. The need for a comprehensive system to protect the environment from ionising radiation is now widely recognised and is part of the agenda of all international organisations working on radiation protection, including the IAEA, ICRP and others.

A survey of the status of international development on the subject of radiological protection of non-human species was undertaken to ensure that the NNR is kept abreast of international developments in this area of work. Findings from the survey indicate that protection of the environment is developing rapidly at national and international levels, but no internationally agreed recommendations have been formulated on how to carry out radiological protection of the environment.

In the light of international developments presented in the report, the NNR will continue to monitor the current research development to determine future research focus areas.

11.6 Iodine Prophylaxis – Potassium Iodate Distribution

The NNR has completed its report on potassium iodate distribution in the event of a nuclear emergency, in the light of a recommendation by the World Health Organisation (WHO) and the IAEA to lower the intervention levels for the distribution of the tablets. To assist in establishing a position on the matter, the NNR consulted with the Australian Radiation Protection and Nuclear Safety Authority (ARPANSA) which has performed a study on this matter, and the French Nuclear Safety Authorities (ASN).

The Koeberg-specific analysis, conducted by the NNR, relates the reduction in intervention level to risk benefit in terms of the numbers of cancers averted. On the basis that the risk benefit is not significant compared to the additional effort necessary for the implementation of reduction in intervention level as recommended by the WHO, the NNR report concluded that the WHO recommendation should not be adopted for Koeberg.

11.7 Prescription Period for Financial Liability for Nuclear Damage

Following concerns raised regarding financial liability for nuclear damage in the last reporting period, the matter has been discussed within the IAEA International Nuclear Liability Expert (INLEX) group. Feedback from INLEX indicated that this problem is not unique to South Africa but is experienced internationally as well. The matter continues to receive attention and will be raised with the Minister in the next reporting period.

International Participation

12

In order to achieve its vision of being a leading, impartial authority for the regulation of the safe use and handling of nuclear and radioactive material, it is important that the NNR ensures that its regulatory practices are in line with or benchmarked against best standards and practices as applied internationally within the nuclear industry and more particularly within the associated nuclear regulatory authorities fraternity.

Towards this objective, the NNR participates in a number of international forums to:

- Develop information exchanges with its foreign counterparts related to regulatory systems and practices, problems encountered in the field of nuclear safety and radiation protection, with a view to enhancing its regulatory approach;
- Improve and strengthen its position in technical discussions with the authorisations holders;
- Build its internal capacity through international training programmes as well as the exchange of personnel with other regulators; and
- Play an active role in international work to harmonise nuclear safety and radiation protection principles and standards.

The NNR pursues these objectives within the framework of bilateral agreements with regulators of other countries, and also through participation in the work co-ordinated by international bodies such as the IAEA. The NNR is also an active participant in and supports the IAEA African Regional Cooperative Agreement (AFRA).

Some of the international initiatives undertaken by the NNR in the review period, are indicated below:

12.1 The International Atomic Energy Agency (IAEA)

The NNR participates actively in IAEA Safety Standards Committees, working groups and technical committee meetings to develop and approve the draft safety standards.

NNR staff attended the following meetings at the IAEA Headquarters in Vienna during the reporting period:

- NUSSC meetings;
- RASSC meetings;
- WASSC meetings;
- TRANSSC meetings; and
- CSS meetings

The IAEA Standards serve as references and benchmarks for South African nuclear safety and radiation protection. This largely comprises reference to the IAEA standards in regulatory requirements and guidance documents. Further, indirect use of the IAEA material is also made in the development of standards and regulations and sometimes in dealing with issues for which there is no established South African standard.

The suite of IAEA Safety Standards and the current IAEA Basic Safety Standards in particular were used as references in the development of the recently published South African regulations on "Safety Standards and Regulatory Practices" that were established in terms of the provisions of the National Nuclear Regulator Act.

The NNR has implemented the IAEA requirements document TS-R-1 as the requirement for safe transport of radioactive material in South Africa.

12.2 International Nuclear Safety Group (INSAG)

An NNR staff member is serving on the International Nuclear Safety Group of the IAEA (INSAG) and attended an INSAG meeting held in Mumbai, India from 12 to 15 March 2007.

This forum has produced documents on Harmonisation of Nuclear Safety Standards, Operating Experience Feedback, Stakeholder Relations, Safety Goals and High Temperature Gas Reactors, which have been circulated and discussed with NNR staff over the past four years. The NNR staff member was invited to make presentations at the Bhabha Atomic Research Centre, Mumbai, on Safety Goals and the licensing of the PBMR. The IAEA is progressing towards the development of safety assessment guidelines using safety goals as proposed in the paper, as well as the SAR structure.

12.3 IAEA General Conference

The IAEA General Conference is an important annual event during which international regulatory matters are discussed and agreed upon. Further, the Conference agrees the scope of work to be undertaken by the IAEA during the year ahead.

The NNR participates in these discussions as part of the South African delegation, led by the Minister of Minerals and Energy. The 50th IAEA General Conference was held in September 2006 in Vienna, Austria.



12.4 Participation in the Multinational Design Evaluation Programme (MDEP)

The NNR has been actively involved in all MDEP activities since its inception. Participation in this initiative is particularly important, given the licensing of the PBMR, and the potential for building new reactors in South Africa.

The MDEP was initiated by the USNRC to facilitate co-operation among nuclear regulators involved in the safety review of new reactor designs which are intended for construction in worldwide markets or at least in more than one country. The purpose of the MDEP is to ensure that a design found suitable in one country does not have to be substantially modified to meet licensing requirements elsewhere. This can be achieved if the requirements that must be satisfied in one country are consistent with, or at least not significantly different from, those that must be satisfied in another country.

Regulators from the USA, France, China, Japan, South Korea, Canada, UK, Russia, Finland and South Africa as well as the IAEA attended the first workgroup meeting whose main objective was to define and further develop a licensing basis framework which could be applied to the review of new reactor designs. Two areas of work were identified for initial focus:

- A Steering Technical Committee (STC) was tasked with assessing the regulatory programmes and requirements associated with the licensing of new nuclear power plants. In addressing this subject, the STC is required to focus on the broad issues of the Licensing Basis; the Scope of Design Reviews; and the use of Safety Goals for each participating country. It will also exchange information with the IAEA.
- A Working Group on Component Manufacturing Oversight (WGCMO) was tasked with assessing the regulatory requirements and review associated with the manufacturing processes for components for use in nuclear power plants. In addressing this subject, the working group is required to focus on the manufacturing processes for components in the highest mechanical safety class for each participating country.

12.5 Network of Regulators of Countries with Small Nuclear Programmes (NERS)

The NNR is a member of the NERS and participated in the Network to exchange information and experiences with other participating regulators. During the review period the NNR attended the 9th annual NERS meeting which was held in Slovenia from 7 to 9 June 2006. The major points of discussions covered during the meeting were:

- Aging and Life Time Management;
- Regulatory Control of Radioactive Waste Management;
- Regulatory Control of Transport of Radioactive Materials; and
- Regulatory Control of Radioactive Sources.

The NNR provided input to the meeting through presentation and technical discussions with other regulators and gained useful insights on the experiences of other regulators. The meeting also provided the NNR with the opportunity to compare its regulatory oversight with practices in other countries. In order to ensure a proactive approach to possible regulatory challenges, the NNR continues to pay attention to the issues and problems experienced by other regulators.

12.6 The International Nuclear Law Association (INLA)

INLA is an international non-governmental organisation, recognised by the IAEA, whose objectives are the exchange of information and the conducting of research with respect to issues related to nuclear law.

12.7 The International Nuclear Liability Expert Group (INLEX)

The NNR is represented on the INLEX Group established by the IAEA. The function of INLEX is to:

- Enhance global adherence by nuclear and non-nuclear States to an effective liability regime;
- Assist in the development and strengthening of national nuclear liability legal frameworks in IAEA member States to protect the public and the environment and to enhance nuclear safety; and
- Provide recommendations to the Director General and the Board of Governors.

The NNR participated in the 6th meeting of INLEX held in Vienna from 25 to 27 May 2006.

12.8 Co-operation in the African Continent

Within the African regional context South Africa is a member of the African Regional Cooperative Agreement (AFRA) which was established by the Heads of State of African countries that are members of the IAEA. South Africa, and the NNR in particular, are being called upon to play an increasing role in the strengthening of nuclear and radiation safety regulatory infrastructure throughout the African region.

Some of the initiatives undertaken by the NNR in the review period include:

12.8.1 *Radiation Safety Infrastructure Appraisal (RaSIA) Mission*

During the review period the NNR participated in the IAEA RaSIA missions to Tunisia and Zambia.

12.8.2 *Forum of African Regulators*

Pursuant to the South African initiative to establish a forum of African Nuclear Safety Authorities, the NNR initiated the establishment of an African Nuclear Regulators' Group.

The forum aims to:

- Strengthen the regulatory oversight of nuclear and radiation safety within the African continent;
- Enhance the sharing and exchange of information related to nuclear and radiation safety;
- Establish working group committees as may be required; and
- Organise training seminars as required.

The IAEA was requested to assist in the establishment of such a forum.

12.9 Other International Co-operation

NNR staff members extended their knowledge base and kept abreast of the latest international trends and developments through participation in international forums, scientific and technical visits as well as attendance of technical meetings and conferences.

- NNR staff attended the eighth conference on Plant Life Management and Plant Licence Extension (PLIM + PLEX) that took place from 10 to 11 April 2006 in Paris, France. The conference was dedicated to nuclear aging management and related licensing issues.
- NNR staff attended an International Workshop on Internal Dosimetry over the period 2 to 6 October 2006.
- The SADRWMS Meeting was held from 30 October to 3 November 2006 and the NNR was represented at the meeting.
- NNR staff attended the IAEA Mission in Romania from 6 to 8 December 2006.
- The IAEA Decommissioning Conference was held from 11 to 15 December 2006 and the NNR participated.
- NNR staff attended a meeting with the French regulator's TSO, IRSN, in January 2007, to finalise the proposed Memorandum of Agreement between the two organisations relating to technical support for review and assessment work to the NNR.
- A PBMR project meeting was held with the NNR TSOs in Cologne, Germany from 19 to 21 February 2007.
- NNR staff attended the PBMR code development meetings between the NNR, National Nuclear Corporation and TUV Rheinland in Knutsford, United Kingdom from 12 to14 February 2007.
- NNR staff attended a technical meeting on Power Uprate and the Side Effects on Nuclear Power Plants from 12 to 15 February 2007 in Oskarshamn, Sweden.
- From 14 to 23 February 2007, three NNR staff attended various meetings abroad including one related to PBMR project business, a meeting with the ASN as well as a meeting of the European Union Safety Advisory Group (SAG) of the Raphael Project related to High Temperature Gas Cooled Reactors.
- An NNR delegation visited the ASN in Paris over the period 12 to16 March 2007 to discuss technical issues relating to Koeberg Nuclear Power Station.
- Two NNR staff member attended an IRSN training course on severe accident progression in Cadarache, France from 12 to 16 March 2007.
- A NNR staff member attended the NORM V Conference from 19 to 23 March 2007 in Spain.
- Two NNR staff members were seconded to observe the LD1094 compliance audit conducted by PBMR (Pty) Ltd on the supplier of the Reactor Pressure Vessel, ENSA, in Santander, Spain from 26 to 29 March 2007.
- Four NNR staff members have been seconded to AMEC National Nuclear Corporation in the UK for work programmes related to the PBMR.

12.10 Bilateral Agreements

During the reporting period the NNR concluded a bilateral agreement with the Argentinean Nuclear Regulatory Authority (ARN). The agreement was signed on 28 February 2007 and provides for fostering of technical co-operation, exchange of information, regulatory research and building of capacity.

Within the framework of the bilateral agreement between the NNR and the French Nuclear Safety Authority a bilateral meeting took place from 10 to 12 October 2006 at the NNR offices in Centurion. Presentations were made on a wide range of issues of mutual interest to both organisations covering Power Reactors, Research Reactors, emergency preparedness, and regulation of NORM. Technical support to the NNR from the ASN/IRSN on Koeberg related assessments was also discussed. Technical exchanges have subsequently taken place including meetings on a wide range of safety issues relating to Koeberg, and participation by the NNR in inspections at the Blayais Nuclear Power Station in France. The NNR is presently preparing a draft contract and a detailed proposal for ongoing technical support.

A bilateral agreement was concluded with the United States Nuclear Regulatory Commission (USNRC). The bilateral agreement provides for the fostering of technical co-operation, exchange of information, and co-operation in nuclear safety matters. Under this agreement the USNRC made available to the NNR computer codes used in the United States for regulation of nuclear facilities.

During the year under review the NNR initiated action to renew co-operation with those countries with which the NNR had previously signed bilateral agreements but with whom the agreements had lapsed. Discussions were started with the following regulators:

- Nuclear Installations Inspectorate (NII) in the United Kingdom;
- Canadian Nuclear Safety Commission (CNSC) in Canada;
- Association Vinçotte Nucléaire (AVN) in Belgium;
- Statens Kärnkraftinspektion (SKI) in Sweden;
- Korea Institute of Nuclear Safety (KINS) in South Korea; and
- Slovenian Regulatory Authority.

Communications and Outreach Initiatives

13

13.1 Public Safety Information Forum

In accordance with the provisions of Government Notice No. 299, dated 12 March 2004 and section 26(4) of the NNR Act, Public Safety Information Forums have been established by:

- Eskom for the Koeberg Nuclear Power Station; and
- Necsa for Pelindaba and Vaalputs respectively.

These forums meet on a quarterly basis and are aimed at informing the people living in the relevant municipal area, in respect of which the respective emergency plans have been established, on nuclear safety and radiation safety matters (including emergency planning) related to the relevant nuclear installation.

The Chairpersons and Deputy Chairpersons of the forums are elected annually at the first meeting. The NNR was invited and attended the meetings of the forums and made presentations related to the mandate of the NNR, outcomes of emergency planning and preparedness and NNR outreach initiatives.

13.2 General Outreach Programmes

DME Eastern Cape Information Session

NNR staff participated in a DME information session, held on 5 October 2006 at Idutywa Community Hall in Mbhashe Municipality (Eastern Cape). Learners, teachers, Community Based Organisations (CBOs), municipal officials, councillors and the general public attended the session. The presentation by the NNR covered the following:

- The work and functions of the NNR as an independent regulator;
- Skills required to work at the NNR;
- NNR career related initiatives;
  - Schools science project;
  - Bursary schemes;
  - Internships; and
  - Involvement in national universities capacity building initiatives.

The information session highlighted the importance of providing the public with information on the NNR and the impact thereof on communities.

Career Expo

NNR staff made a presentation to Grade 12 pupils who attended the career expo that was held at Pilditch Stadium in Pretoria in February 2007.

13.3 Koeberg Outreach Programmes

Nuclear Emergency Preparedness Regulatory Oversight Committee (NEPROC)

In terms of liaison with local/municipal and provincial authorities in the vicinity of Koeberg, the following meetings were held:

- NEPROC meetings held on 1 June, 15 August, 8 November 2006 and 14 February 2007; and
- EPSOC meetings attended, held on 1 June, 15 August, 8 November 2006 and 14 February 2007.

The main outcomes to date are outlined below:

- The requirements in terms of developments in the vicinity of Koeberg;
- Monitoring of the development of the late phase aspects of the Koeberg emergency plan;
- Reporting and follow-up on emergency exercises; and
- Follow up on specific international issues such as intervention levels for the distribution of potassium iodate pills.

Meeting between the NNR and Labour Union Representatives at Koeberg

The purpose of these meetings is to discuss matters of mutual interest or concern relating to nuclear safety and public communication. Three meetings were held with representatives of the various unions at Koeberg (namely MWU, EEA, NUM, NUMSA) during the reporting period. Key items for discussion were:

- Emergency exercises – performance of workers at Koeberg in the exercises;
- Control zone access and medical examinations;
- Outsourcing to contractors; and
- The way forward in terms of liaison between the NNR and the Atlantis community, and public communication in general.

At the meeting of 7 February 2007, which was poorly attended due primarily to the absence of any major issues, it was decided to reduce the frequency of these meetings to two per annum, with *ad hoc* meetings to be held as needed.

Human Resources

14

14.1 The Structure of the Regulator

The NNR is a two tier organisation, comprising a Board of Directors and an executive arm, headed by the Chief Executive Officer. The Executive comprises a complement of specialist engineers, scientists and their support staff who perform the technical functions. The Board and Chief Executive Officer are appointed by the Minister of Minerals and Energy.

The NNR organisational structure is detailed in the figure below:

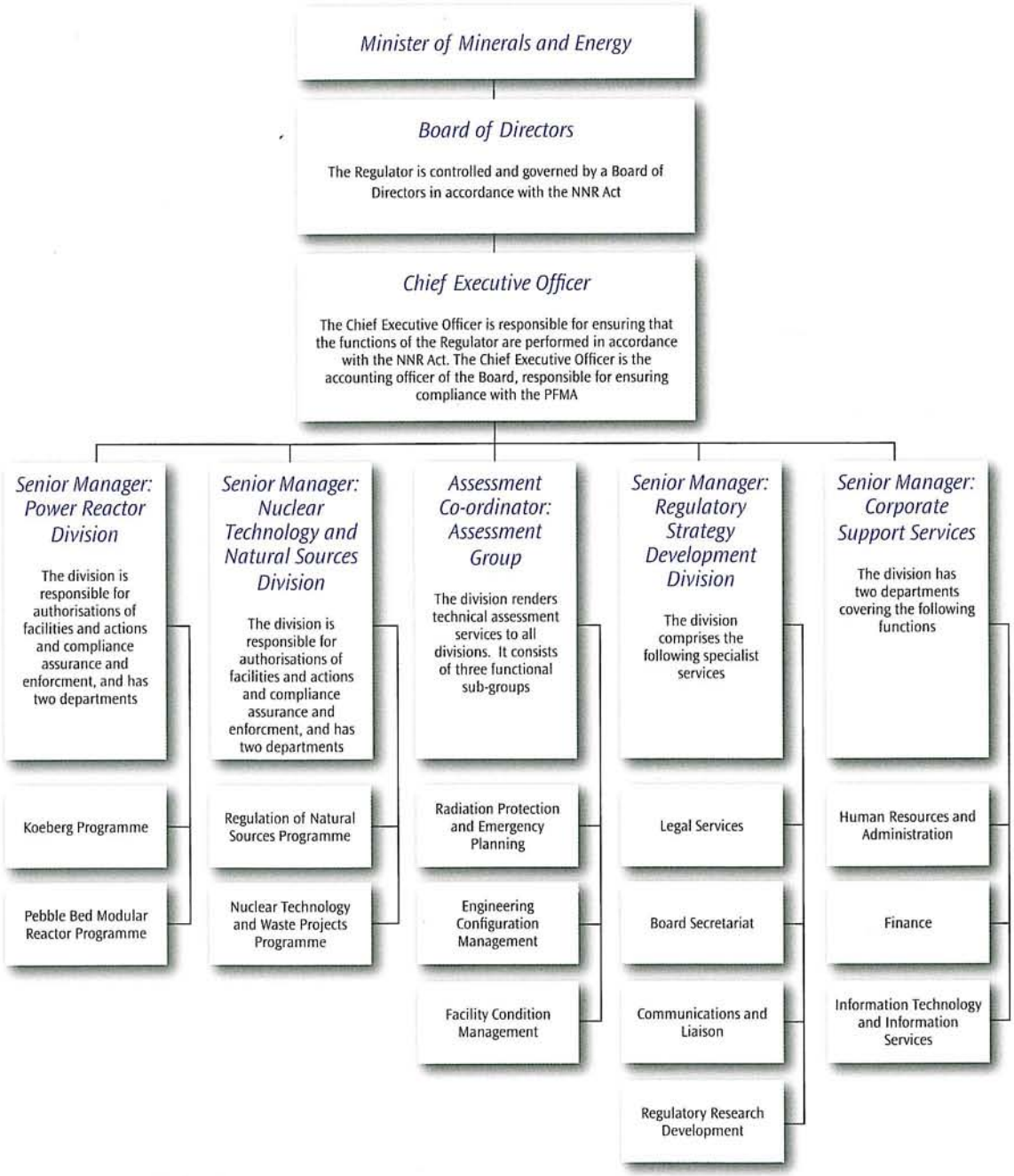


Figure 9: NNR Organisational Structure

14.2 The Board of Directors

The Board exercises general control over the performance of the NNR in the fulfilment of its mandate and function assigned under the NNR Act. The NNR Board is a multi-stakeholder Board, representing labour organisations, communities affected by nuclear activities, industry and government, and comprises technical, medical, legal, financial and other experts in their respective fields. The Board is committed to fulfilling the NNR mandate to protect persons, property and the environment against the risk of nuclear damage arising from the exploitation of radioactive materials in South Africa. The Board comprises the following members:



Prof MA Hermanus

Prof MA Hermanus (Chairperson)
Ms Mavis (May) Ann Hermanus is Director and Adjunct-Professor of the Centre for Sustainability in Mining and Industry (CSMI) of the School of Mining Engineering, Faculty of Engineering and the Built Environment, University of the Witwatersrand. She gained her BSc (Geology) at the University of Cape Town and MSc (Engineering, Physical Metallurgy) at the University of the Witwatersrand.



Ms TN Mgoduso

Ms TN Mgoduso (Deputy Chairperson)
Ms Mgoduso has held the position of Director, Imperial Logistics since September 2004. Prior to that, she was the CEO of Freightdynamics, a Transnet business unit. She gained her BA and BA Honours at the University of Fort Hare, followed by scholarships in Germany. She completed her MA in Clinical Psychology at the University of the Witwatersrand, followed by management studies at the Wits Business School and specialised courses in the US, UK and Singapore.



Mr MT Magugumela

Mr MT Magugumela (Chief Executive Officer: NNR)
Mr Magugumela is the Chief Executive Officer of the NNR. Mr Magugumela holds a BSc in Physics and Mathematics from Allegheny College, USA and an MA in Physics from Rice University, USA. He is a member of the IAEA's Commission on Safety Standards (CSS), which advises the Director-General of the IAEA on nuclear safety matters.



Mr D Elbrecht

Mr D Elbrecht
Mr Elbrecht represents organised labour and is the National Treasurer and a member of the National Executive of the National Union of Mineworkers. He holds an NTC 6 certificate and numerous management and leadership qualifications.



Mr K Govender

Mr K Govender
Mr Krishna Govender is Financial Manager at M-Net. He completed his BCom at the University of Natal (Pietermaritzburg) and his Honours in Accounting at the University's Durban campus. He obtained his CA (SA Institute of Chartered Accountants) in 2001 followed by the Public Practice Examination (Public Accountants' and Auditors' Board) in 2005.



Rev PJ Grove

Rev PJ Grove
Rev Grove, who represents communities that may be affected by nuclear activities, is a Minister of Religion, currently attached to the Bureau for Continuing Theological Education and Research at Stellenbosch University. His academic qualifications are BA Hons (Sociology) and BTh (UWC).



Mr WN Lesufi

Mr WN Lesufi

Mr Wilson Nikisi Lesufi is the Environmental Adviser to the Chamber of Mines. He gained his BPharm at the University of the North (1985), his BSc (Hons) in Biological Sciences at the University of Leicester (UK) (1989), and his MSc in Microbiology at the University of London (1991).



Adv BM Mkhize

Adv BM Mkhize

Adv Mkhize is the Registrar and CEO of the Health Professions Council of South Africa. He gained his BJuris and LLB degrees from the University of Zululand, Advanced Diploma in Labour Law (cum laude) and Business Management Programme from UNISA, and was admitted as an Advocate of the high Court of South Africa. He has served on numerous church, community and training bodies.



Mr BA Ramahlo

Mr BA Ramahlo

Mr Boetse Abel Ramahlo is the Security Executive with Sentech. He has a diploma in international relations and diplomacy, BA (Political Science) and an MSS (Master of Security Studies) from the University of Pretoria.



Mr J Rocha

Mr J Rocha

Mr Rocha is the Deputy Director-General: Minerals Regulation at the Department of Minerals and Energy. He holds a BA Honours in Political Science, BSc Honours in Geology and GDE in Mining, and is currently engaged in studies for his LLB. He led the team that drafted the new Mining and Minerals Policy.



Dr DG van der Merwe

Dr DG van der Merwe

Dr Debbie van der Merwe is Head of Medical Physics at Johannesburg Hospital/University of the Witwatersrand. She is registered as a Medical Physicist (Ionising Radiation) with the Health Professions Council of South Africa.



Ms J Yawitch

Ms J Yawitch

Ms Joanne Yawitch is the Deputy Director-General: Environmental Quality and Protection at the Department of Environmental Affairs and Tourism. She received her BA, BA Hons and MA Development Studies from the University of the Witwatersrand, and her MSc Agriculture Development (with distinction) from the University of London.



Mrs TN Zungu

Mrs TN Zungu

Mrs Zungu is Chief Director: Audit Services at the Department of Minerals and Energy. She gained her BCom (Accounting and Auditing) at the University of Zululand, followed by a post-graduate Higher Diploma in Education (Commercial) at the University of Durban-Westville. She received specialised in house-training with Unilever (SA) and Shell (London).

14.3 Challenges in the Operating Environment

The nuclear landscape in South Africa is undergoing significant changes, reflecting developments in the global nuclear industry, in particular a growing international trend towards a resurgence of nuclear power. These changes have introduced many human resource challenges with which the NNR has had to grapple. These include:

- A small national pool of appropriately skilled persons and local technical support organisations that is insufficient to sustain the nation's current and growing needs. These skills shortages cut across all levels and spheres of the industry and are set to increase in the medium to long term with the growth in competition for expertise within the nuclear industry;
- A new technology, the pebble bed modular reactor, which is currently being pursued;
- Envisaged increases in the number of nuclear power plants by Eskom (including conventional nuclear power plants);
- International trends suggest that in the medium term, there will be an upsurge in interest in uranium mining, largely fuelled by the resurgence of nuclear interest. Uranium production in South Africa is likely to grow in response to market need;
- Increased security concerns, specifically, security of nuclear installations and safety of radioactive sources;
- Increased public need for information and pressure for greater stakeholder involvement in decision-making;
- Population development in South Africa, which has fuelled the demand for land which was previously used for mining purposes to be used for low cost housing, recreational facilities etc;
- Urban development in some areas has led to growing pressure to increase housing developments in and around the nuclear facilities, in particular Koeberg nuclear power station;
- Increasing pressure on South Africa, as a major player in the African nuclear industry, to lead the setting of regional and continental nuclear standards. Furthermore, South Africa has increased responsibility to adhere to the international conventions, standards and bilateral agreements that the NNR subscribes to;
- International resurgence of building of new nuclear power plants, which may put additional strain on the limited local resources; and
- Harmonisation of international standards and practices in order to bring about regulatory effectiveness.

14.4 Approved Staff Complement of the NNR

Chief Executive Officer	1
Senior Management	5
Departmental Management	8
Process/Functional Sub-group Co-ordination	9
Regulatory Officials and Specialists (all levels)	44
Administrative, Secretarial and Support staff	19
Total	**86**

14.5 Employment Equity

Compared to the previous reporting period, the NNR improved its employment equity profile. The number of black males increased by 2% as did the number of black females. The number of white females and males decreased by 1% and 3% respectively. The total number of males decreased by 1%, while female representation increased by 1%.

14.5.1 Composition of Staff by Race

White males	19	(26%)
Black males	30	(41%)
White females	10	(14%)
Black females	14	(19%)
Total	**73**	

Included in the above staff complement are two (2) disabled persons.

14.5.2 Composition of Staff by Gender

Females	24	(33%)
Males	49	(67%)

14.5.3 Management

Senior Management

White males	1	(20%)
Black males	4	(80%)
White females	0	(0%)
Black females	0	(0%)
Total	**5**	

Departmental Management

White males	2	(25%)
Black males	6	(75%)
White females	0	(0%)
Black females	0	(0%)
Total	**8**	

Included in the above staff complement is one (1) disabled person.

14.5.4 Staff Composition by Age

Age Group		
18-30 Years	11	(15%)
31-40	28	(39%)
41-50	17	(23%)
51-65	17	(23%)
Total	**73**	

14.6 Staff Turnover

During the reporting period a total of eleven (11) employees resigned from the organisation and a total of ten (10) new employees were appointed.

14.7 Transformation Policy and Plan

Over the past year, the NNR focused on making changes to improve every aspect of the organisation's business. The focus has been on making changes within the framework of current legislation. Steady progress has been made toward transformation priorities and the organisation has now prepared the groundwork for long-term reforms in the way it performs its work:

- Improvement of service delivery and standards has seen progress. The NNR has customised the Balanced Scorecard as an organisational performance system;
- The alignment of workplace policies and procedures with democratic values has been progressed;
- The establishment of equity has led to the development of an Employment Equity Policy and Plan and Preferential Procurement Policy;
- The building of capacity has been accelerated as stated above. NNR commitment to staff consultation and participation continues; and
- There are two unions (Staff Association and NEHAWU), and several human resource committees in which staff participate, e.g. the Training and Development, HIV/AIDS and Employment Equity Monitoring Committees.

14.8 Internal Capacity Building

The NNR is challenged in sustaining an appropriate level of in-house technical capacity (engineers and scientists) to deliver on its core business.

As a matter of priority, the NNR has proactively engaged in strengthening its in-house capacity, identifying strategic initiatives that will enable it to develop the technical expertise of its human resources, and also enhancing its ability to attract and retain scarce talent.

In order to respond to the challenge outlined above, the NNR has developed remuneration and performance management systems that in the short- to medium-term will allow the NNR to attract, develop and retain staff to maximise internal capacity. The NNR has also developed a retention strategy linked to performance management in order to retain key and critical skills within the organisation. Both systems will be fully implemented in the 2007/08 financial year

14.8.1 Staff Training and Development

- Two NNR staff were enrolled to do selective modules of the MSc in Nuclear Engineering at the University of the North West as part of their respective personal development plans.
- During the reporting period four NNR staff attended the BIRA training in PRA and risk management.
- The DME, in co-operation with the IAEA, presented a National Security Training Course on the Physical Protection of Nuclear Material and Facilities in Cape Town which was attended by NNR staff from 30 October to 10 November 2006.
- An NNR staff member has been seconded to participate in the Wits Reactor Course.
- An NNR employee has been seconded to Necsa to undertake practical training in order to complete the National Diploma: Metallurgy.
- NNR staff attended nuclear engineering modules at the North West University in February and March 2007.

14.8.2 Interns

Four (4) new interns were accepted to the NNR during the reporting period.

14.9 National Capacity Building

The NNR contributes to South Africa's national capacity building programmes and played a key role during the reporting period in assisting with the development of a university curriculum, supervising post graduate students and delivering presentations at various courses offered by South African universities.



14.10 NNR Regulatory Capacity

NNR staff members are proficient in a wide range of disciplines including engineering, plant maintenance, nuclear safety, transport safety, radiation protection, waste safety and physical protection.

All new staff members served a period of induction during which they were introduced to:

- The applicable legislation;
- The facilities being regulated; and
- The conditions of authorisation associated therewith.

14.10.1 Koeberg Programme (KP)

The KP has eleven technical positions, including the departmental manager, secretary, two co-ordinators and seven regulatory officers. All these posts are presently filled except for two senior regulatory officer posts in the field of plant operations and operator licensing.

14.10.2 The Nuclear Technology and Waste Projects (NTWP) Programme

The NTWP Division has eight technical positions, including the departmental manager, secretary, two co-ordinators and four regulatory officers. All these posts are presently filled except for one senior regulatory officer post in the field of radiation protection.

In addition, the regulatory officers receive training in auditing and inspection techniques and the use of radiation instrumentation.

14.10.3 Regulation of Natural Sources (RENS) Programme

The RENS department has eight technical positions, including the departmental manager, secretary, two co-ordinators and four regulatory officers. All these posts are presently filled.

14.10.4 Pebble Bed Modular Reactor (PBMR) Programme

The PBMR department has six technical positions, including the departmental manager, secretary and four regulatory officers. All these posts are presently filled except for two senior regulatory officer posts in the field of plant operations and operator licensing.

14.10.5 Assessment Group and Regulatory Strategy Divisions

The above departments are supported by the Assessment Group which has 25 specialists and the Regulatory Strategy Division which has eight technical positions. In areas where gaps were identified in skill, discipline or specific coverage, the Assessment Group contracted the services of external technical support organisations.

Report of the Audit and Risk Management Committee

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The Audit and Risk Management Committee has adopted appropriate formal terms of reference, which have been confirmed by the Board, and has satisfied its responsibilities as set out in the terms of reference.

In performing its responsibilities the Audit and Risk Management Committee has reviewed the following:

- The effectiveness of internal control systems;
- The effectiveness of the internal audit;
- The output of a risk assessment workshop to identify the major risks faced by the organisation;
- Risk areas of the entity's operations to be covered in the scope of internal and external audits;
- The adequacy, reliability and accuracy of financial information provided to management;
- The accounting or auditing concerns identified as a result of the internal or external audits;
- The adequacy of the policies and procedures considered necessary to comply with the requirements of the Public Finance Management Act;
- The entity's compliance with legal and regulatory provisions;
- The activities of the internal audit function, including its annual work programme, co-ordination with the external auditors, the reports of significant investigations and the responses of management to specific recommendations;
- The adequacy of the terms of reference of the audit committee as well as other Board committees; and
- The scope and results of the external audit, and its cost effectiveness.

The Audit and Risk Management Committee has also been responsible for:

- Approving the Internal Auditing Charter and Work Plan;
- Approving the Fraud Prevention Policy and Plan;
- Approving the Risk Management Plan;
- Ensuring adequate segregation between non-audit services and the internal audit function, where these services were provided by the same accounting firm; and
- Encouraging improved co-ordination and liaison between board committees in those areas where responsibilities overlap.

The Audit and Risk Management Committee notes that during the past year there has been further improvement in terms of internal controls and financial management systems. The Committee considers that the system of internal controls has ensured that the entity's major risks have been reduced to an acceptable level.

The Audit and Risk Management Committee has evaluated the annual financial statements of the National Nuclear Regulator for the year ended 31 March 2007 and concluded that they comply, in all material respects, with the requirements of the Public Finance Management Act (Act No. 1 of 1999, as amended), together with the associated Treasury Regulations, and South African Statements of Generally Accepted Accounting Practice.

The Audit and Risk Management Committee concurs with the going concern premise in preparing the annual financial statements, and has recommended their adoption by the Board of Directors.



Adv B Mkhize
Chairperson: Audit and Risk Management Committee

Statement of Responsibility

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The Public Finance Management Act (Act No. 1 of 1999, as amended) (PFMA), requires that the Directors ensure that the entity maintains full and proper records of its financial affairs and that its annual financial statements fairly present the state of affairs of the entity, its financial results, its performance against predetermined objectives and its financial position at the end of the year in terms of Generally Accepted Accounting Practice.

The external auditors are responsible for independently auditing and reporting on the financial statements. The Office of the Auditor-General has audited the financial statements and the Auditor-General's Report appears on page 54 to 55.

The annual financial statements have been prepared in accordance with Statements of Generally Accepted Accounting Practice and the Companies Act. These annual financial statements are based on appropriate accounting policies, supported by reasonable and prudent judgments and estimates.

The Directors have reviewed the National Nuclear Regulator's budgets and cash flow forecasts for the year ending 31 March 2007. On the basis of this review, and in view of the current financial position and existing borrowing facilities, the Directors have every reason to believe, and the auditors concur, that the National Nuclear Regulator will be a going concern in the year ahead and have continued to adopt the going concern basis in preparing the financial statements.

The Board of Directors sets standards and monitors the implementation of systems of internal control and risk management that are designed to provide reasonable, but not absolute assurance against material misstatements and losses. The National Nuclear Regulator maintains internal financial controls to provide assurance regarding:

- The safeguarding of assets against unauthorised use or disposition; and
- The maintenance of proper accounting records and the reliability of financial information used within the business or for publication.

The Directors have reviewed the entity's systems of internal control and risk management for the period 1 April 2006 to 31 March 2007. The Directors are of the opinion that the Regulator's systems of internal control and risk management were effective for the period under review and records that further improvements are being implemented.

In the opinion of the Directors, based on the information available, the annual financial statements fairly present the financial position of National Nuclear Regulator at 31 March 2007 and the results of its operations and cash flow information for the year.

The annual financial statements and performance against objectives for the year ended 31 March 2007, set out on pages 56 to 83, were approved by the Board of Directors of the National Nuclear Regulator on 26 July 2007, and are signed on its behalf by:



Prof MA Hermanus
Chairperson



Mr MT Magugumela
Chief Executive Officer

Report of the Auditor-General

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REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE FINANCIAL STATEMENTS AND PERFORMANCE INFORMATION OF THE NATIONAL NUCLEAR REGULATOR (NNR) FOR THE YEAR ENDED 31 MARCH 2007

Report on the Financial Statements

Introduction

1. I have audited the accompanying financial statements of the National Nuclear Regulator (NNR), which comprise the statement of financial position as at 31 March 2007, statement of financial performance, statement of changes in net assets and cash flow statement for the year then ended, and a summary of significant accounting policies and other explanatory notes, as set out on pages 70 to 83.

Responsibility of the accounting authority for the financial statements

2. The accounting authority is responsible for the preparation and fair presentation of these financial statements in accordance with South African Statements of Generally Accepted Accounting Practice and Standards of Generally Recognised Accounting Practice and in the manner required by the Public Finance Management Act, 1999 (Act No. 1 of 1999) (PFMA). This responsibility includes:
   - designing, implementing and maintaining internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error
   - selecting and applying appropriate accounting policies
   - making accounting estimates that are reasonable in the circumstances.

Responsibility of the Auditor-General

3. As required by section 188 of the Constitution of the Republic of South Africa, 1996 read with section 4 of the Public Audit Act, 2004 (Act No. 25 of 2004) and section 7(1) (j) of the National Nuclear Regulator Act, 1999 (Act No. 47 of 1999), my responsibility is to express an opinion on these financial statements based on my audit.
4. I conducted my audit in accordance with the International Standards on Auditing and *General Notice 647 of 2007*, issued in *Government Gazette No. 29919 of 25 May 2007*. Those standards require that I comply with ethical requirements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free from material misstatement.
5. An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control.
6. An audit also includes evaluating the:
   - appropriateness of accounting policies used
   - reasonableness of accounting estimates made by management
   - overall presentation of the financial statements.
7. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Basis of accounting

8. The entity's policy is to prepare financial statements in terms of South African Statements of Generally Accepted Accounting Practice and Generally Recognised Accounting Practice as set out in note 1 of the financial statements.

Opinion

9. In my opinion the financial statements present fairly, in all material respects, the financial position of National Nuclear Regulator as at 31 March 2007 and its financial performance and cash flows for the year then ended, in accordance with the identified basis of accounting, as described in note 1 and in the manner required by the PFMA.

Emphasis of matters

Without qualifying my audit opinion, I draw attention to the following matters:

10. Highlight of a matter affecting the financial statements which is included in a note to the financial statements
    With reference to note 14 of the financial statements the NNR is in the process of revising the conditions of the grant received from the Department of Minerals and Energy.



Other Matters

I draw attention to the following matters that are ancillary to my responsibilities in the audit of the financial statements:

11. Material non-compliance with applicable legislation
    - Section 53(3) of the Public Finance Management Act, states: "A public entity which must submit a budget in terms of subsection (1), may not budget for a deficit and may not accumulate surpluses unless the prior written approval of the National Treasury has been obtained."
      No prior approval was obtained from National Treasury for the accumulation of the surplus for the year ended 31 March 2006 amounting to R3,755,816.

12. Internal control
    - Information and communication
      The information and communication processes and procedures of the entity were not comprehensive enough. The information and communication systems did not provide for the timely flow of information for the purposes of strategic decision making in respect of:
      - compliance with the requirements of the conditional grant
      - obtaining prior approval from National Treasury for the accumulated surpluses.

13. Unaudited supplementary schedules
    - Note 15 of the financial statement, "Value-added statement" is an unaudited supplementary schedule.

Other Reporting Responsibilities

Reporting on performance information

14. I have audited the performance information as set out on pages 60 to 69.

Responsibilities of the accounting authority

15. The accounting authority has additional responsibilities as required by section 55(2)(a) of the PFMA to ensure that the annual report and audited financial statements fairly present the performance against predetermined objectives of the public entity.

Responsibility of the Auditor-General

16. I conducted my engagement in accordance with section 13 of the Public Audit Act, 2004 (Act No. 25 of 2004) read with *General Notice 646 of 2007*, issued in *Government Gazette No. 29919 of 25 May 2007*.
17. In terms of the foregoing my engagement included performing procedures of an audit nature to obtain sufficient appropriate evidence about the performance information and related systems, processes and procedures. The procedures selected depend on the auditor's judgement.
18. I believe that the evidence I have obtained is sufficient and appropriate to provide a basis for the audit findings reported below.

Audit findings

19. No audit findings come to the fore.

Appreciation

20. The assistance rendered by the staff of the National Nuclear Regulator during the audit is sincerely appreciated.

B R Wheeler for Auditor-General

Pretoria
31 July 2007

AUDITOR-GENERAL

Directors'/Accounting Authority's Report

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18.1 Introduction

The Directors are pleased to present their report which forms part of the audited annual financial statements of the organisation for the year ended 31 March 2007.

18.2 Statutory Basis

The National Nuclear Regulator is listed as a national public entity in Schedule 3 Part A of the Public Finance Management Act, (Act No.1 of 1999, as amended) (PFMA). It was established in terms of Section 3 of the National Nuclear Regulator Act, (Act No. 47 of 1999)

18.3 Mandate

The National Nuclear Regulator is mandated to:

(a) Provide for the protection of persons, property and the environment against nuclear damage through the establishment of safety standards and regulatory practices;
(b) Exercise regulatory control related to safety over:
  i) The siting, design, construction, operation, manufacture of component parts, and the decontamination, decommissioning and closure of nuclear installations; and
  ii) Vessels propelled by nuclear power or having radioactive material on board which is capable of causing nuclear damage, through the granting of nuclear authorisations;
(c) Exercise regulatory control over other actions to which the Act applies, through the granting of nuclear authorisations;
(d) Provide assurance of compliance with the conditions of nuclear authorisations through the implementation of a system of compliance inspections;
(e) Fulfil national obligations in respect of international legal instruments concerning nuclear safety; and
(f) Ensure that provisions for nuclear emergency planning are in place.

The Board of Directors is the accounting authority in terms of the PFMA.

18.4 Board of Directors

Non-Executive Directors

Prof K Bharuth-Ram (Chairperson)	Term ended 30 November 2006
Ms T Mgoduso (Deputy Chairperson)	
Mr D Elbrecht	
Rev P Grove	
Adv B Mkhize	
Mr G Aboobaker	Term ended 30 November 2006
Mr AHCH Motaung	Term ended 30 November 2006
Dr JM Stewart	Term ended 30 November 2006
Dr T Lesoli	Term ended 30 November 2006
Ms T Mashanda	Term ended 30 November 2006
Mr J dos Santos Rocha	
Ms Z Mvusi	Term ended 30 November 2006
Mrs T Zungu	
Ms T Kumalo	Term ended 30 November 2006

Executive Directors

Mr MT Magugumela

Changes in Membership of Non-Executive Directors

Prof MA Hermanus (Chairperson)	Appointed 1 December 2006
Mr K Govender	Appointed 1 December 2006
Mr W Lesufi	Appointed 1 December 2006
Mr B Ramahlo	Appointed 1 December 2006
Dr D van der Merwe	Appointed 1 December 2006
Ms J Yawitch	Appointed 1 December 2006
Ms T Zungu	Appointed 1 December 2006

Alternate Directors

Ms T Zungu (Alternate to Mr J dos Santos Rocha) and Ms T Kumalo (alternate to Ms Z Mvusi) were appointed to represent the Department of Minerals and Energy and the Department of Environmental Affairs and Tourism, respectively.



18.5 Meeting Attendance

Attendance at Board Meetings for the Year Ended 31 March 2007

		Attended	Total Held†
Prof K Bharuth-Ram*	Chairperson	4	7
Ms TN Mgoduso* **	Deputy Chairperson	5	7
Mr MT Magugumela* **	Chief Executive Officer	7	7
Mr D Elbrecht* **	Member	3	7
Rev P Grove* **	Member	4	7
Dr T Lesoli*	Member	4	7
Ms TNM Mashanda*	Member	1	7
Adv BM Mkhize* **	Member	5	7
Mr AHCH Motaung*	Member	3	7
Dr JM Stewart*	Member	5	7
Mr GM Aboobaker*	Member	4	7
Ms Z Mvusi*	Member	5	7
Mr J Rocha* **	Member	2	7
Mrs TN Zungu* **	Alternate Member	4	7
Ms T Kumalo*	Alternate Member	1	7
Prof MA Hermanus**	Chairperson	2	7
Mr K Govender**	Member	1	7
Mr WN Lesufi**	Member	2	7
Mr BA Ramahlo**	Member	2	7
Prof D van der Merwe**	Member	2	7
Ms J Yawitch**	Member	1	7

* Term of office on the Board of the NNR ended 30 November 2006.

** Appointed member of the new Board of the NNR with effect from 01 December 2006

† The total number of Board meetings held was 7. Five (5) were held under the old Board and two (2) under the new Board

Attendance at Board Committee Meetings

Transformation and Development Committee

		Attended	Total Held†
Ms TN Mgoduso* ‡	Chairperson	1	3
Adv BM Mkhize*	Member	3	3
Dr T Lesoli*	Member	2	3
Mr GM Aboobaker*	Member	3	3
Mr AHCH Motaung*	Member	2	3
Mr D Elbrecht‡	Member	0	3
Rev P Grove‡	Member	0	3
Mr BA Ramahlo‡	Member	0	3
Prof D van der Merwe‡	Member	0	3

* Term of office on the committee of the Board ended 30 November 2006

‡ Appointed member of new Board Committee with effect from 01 December 2006

† The total number of TDC meetings held was three (3). These were held under the old Board

Audit and Risk Management Committee

		Attended	Total Held†
Dr J Stewart*	Chairperson	1	3
Adv BM Mkhize* ‡	Member	2	3
Ms S Koyana* ++	Member	1	3
Mr N Lesufi‡	Member	2	3
Ms P Mzizi‡ ++	Member	1	3

* Term of office on the committee of the Board ended 30 November 2006

‡ Appointed member of new Board Committee with effect from 01 December 2006

++ Independent member of the Committee

† The total number of ARM committee meetings held was three (3). One (1) was held under the old Board and two (2) under the new Board

Finance Committee

		Attended	Total Held†
Mrs T Zungu* ‡	Chairperson	2	3
Mr D Elbrecht* ‡	Member	2	3
Mr K Govender ‡	Chairperson	1	3

* Term of office on the committee of the Board ended 30 November 2006

‡ Appointed member of new Board Committee with effect from 01 December 2006

† The total number of Finance Committee meetings held was three(3). Two (2) were held under the old Board and one (1) under the new Board

18.6 Organisational Structure

The National Nuclear Regulator is accountable to the Minister of Minerals and Energy, who, in terms of the PFMA, is the executive authority. The organisational structure is depicted on page 46 of this report.

18.7 Principal Activities

The NNR carries out effective regulatory control by developing and implementing regulatory standards and practices that are comparable to internationally accepted standards and practices. Quantitative and qualitative assessment techniques and safety assurance programmes are applied in an efficient and cost-effective manner.

In the course of implementing its mandate, the NNR maintained focus on its transformation objectives, which are captured in the NNR Strategic Plan. In this regard, the Report on Performance against Objectives which follows reflects the NNR's performance relating to core business, alignment of internal processes to strategy, improvement of stakeholder relations, as well as training and capacity development, employment equity and preferential procurement.

18.8 Review of Operations

The total income for the NNR was R68,197 million (2006: R53,256 million) including the government grant of R14,742 million (2006: R5,417 million) and operating costs amounted to R54,132 million (2006: R52,270 million).

18.9 Events Subsequent to Balance Sheet Date

The NNR directors are not aware of any material event which occurred subsequent to the compiling of the financial statements, which may significantly affect the position of the organisation or the results of its operations.

A process is under way to amend the conditions of the R18 million grant from the Department of Minerals and Energy which was earmarked for the rehabilitation of the sites in the Karoo. Agreement has been reached with the Department of Minerals and Energy to utilise the funds for related activities. This will include the building of a laboratory to be used for independent verification of environmental samples obtained from the activities in the Karoo and to support the growing uranium mining activities.

18.10 Materiality and Significance Framework

A materiality and significance framework was developed for reporting losses through criminal conduct and irregular, fruitless and wasteful expenditure, as well as for significant transactions envisaged in terms of section 54(2) of the PFMA that requires ministerial approval. The framework was finalised after consultation with the external auditors and was approved by the executive authority.

18.11 Stakeholder Relations

The NNR continued to interact and maintain good relations with stakeholders, including the regulated industry, policy/decision-makers (the Parliamentary Portfolio Committee on Minerals and Energy), non-governmental organisations, labour organisations within regulated facilities and strategic operatives such as other organs of state. Co-operative agreements were implemented under the JCC forums, and discussions are under way to conclude co-operative agreements with NERSA, NIA, SAPS and DTEC, as well as international organisations (bilateral agreements were renewed with the Argentine Regulatory Authority and the US-NRC during the reporting period).

18.12 Shareholder Relations

The NNR reported to and held discussions with the Executive Authority on significant events. Major events included interaction with the Department on the monitoring and control of urban development in the vicinity of Koeberg Nuclear Power Station, an appeal to the Minister on the issuance of Variation 26 of Necsa NL-27, international co-operation and participation, regulatory action in respect of the manufacture of components important to safety by PBMR, and enforcement action on a ship carrying radioactive material which docked without authorisation.

18.13 Social Responsibility and Capacity Building

During the reporting period the NNR continued its involvement in capacity building initiatives aimed at promoting the entry of young persons and historically disadvantaged individuals into careers in science, in particular nuclear-related fields. The NNR was also actively involved in the DME Learners' Focus Week throughout the country including the Western Cape, KwaZulu-Natal, North West and Mpumalanga, to create awareness and encourage learners to pursue careers in the fields of science and technology within the mining and minerals processing industry. The NNR also participated in the Science Unlimited Career Expo from 5 to 9 March 2007 at the Tshwane Events Centre (Pretoria Show Grounds), attended by more than 200 high schools throughout the country.

18.14 Addresses

The business addresses of the National Nuclear Regulator are as follows:

Physical address:
Second Floor, Block A
Old Mutual Centre
Embankment Road
Centurion, 0046

Postal address:
PO Box 7106
Centurion
0046

Telephone: (012) 674 7100
Facsimile: (012) 663 5513
E-mail: nnr@nnr.co.za

Report on Performance against Objectives

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A. Core Business

Objectives	Key Performance Indicator	Target	Actual	Performance Results	Notes, Challenges, Comments
To conduct safety assessment reviews for the purpose of granting or refusing authorisations of new actions and approval of changes to existing actions **(CB1)**	All applications/ submissions evaluated against established criteria Initial responses to all applicants within 4 weeks giving proposed timing of the review process Completed application within the proposed timing. Explanation of instances where either of the above was not possible A report to the Board on all of the above	Report to Board	Report on activities for all programmes provided in the Executive report to the Board	Achieved	
		Average of < 90 days (Represents average response time for all submissions)	KNPS 84 days	Achieved	The turnaround time depends on the complexity of submissions. Where response was longer than 90 days this was discussed with the holder and new dates agreed and met
			PBMR 83 days	Achieved	
			NTWP 81 days	Achieved	
			RENS 128 days	Not Achieved	
To regulate the optimal reduction of public and workers' doses and risk for all facilities according to the ALARA principle **(CB2)**	Regulatory processes reviewed and implemented such that: • Authorised actions are operated within regulatory control and if not, enforcement actions will have been implemented • Identified operations requiring to be authorised are within regulatory control and where not, appropriate legislative imperatives will have been applied • A report on the above to the Board, including environmental monitoring around authorised facilities and doses (public and workers) as well as on verification of rehabilitation of contaminated sites	Status report for all authorised facilities	Status report for all regulated facilities (including doses to the public and workers) were reported on as part of the executive report to the Board and will be in the annual report	Achieved	
		Report on verification of rehabilitation (cleanup of contaminated sites)	RENS	Achieved	For the period, a total of 23 applications for release of sites were processed. Of the 23, 19 sites were approved for release from regulatory control
	Public dose	KNPS (Limit – 1 mSv/a)	4×10^{-3} mSv	Achieved	
	Worker dose	KNPS (Limit 50 mSv/a)	12.7 mSv	Achieved	
		Average individual dose NNR ALARA target <5 mSv/a	0.7 mSv	Achieved	



Objectives	Key Performance Indicator	Target	Actual	Performance Results	Notes, Challenges, Comments
	Public risk (KNPS)	Av = 10^{-8}/a Max = 5 x 10^{-6}/a	2 x 10^{-9} /a 3 x 10^{-6}/a	Achieved	This performance measure was applicable only to Koeberg
	Worker risk (KNPS)	Av = 10^{-5} /a Max = 5x10^{-5}/a	2x10^{-6}/a 3x10^{-5}/a	Achieved	
	Worker dose (RENS)	Maximum individual dose (< 50 mSv)	Special case mines: 57.8 mS	Not achieved	2 individuals from one facility received doses higher than 50mSv during the reporting period The NNR directed the facility to stop operations until correctives measures were implemented to the satisfaction of the NNR. Furthermore, both individuals were reallocated to other areas where no further exposure to radiation was expected for the year
		Average individual dose (<20 mSv)	Special case mines: 12.69 mSv	Achieved	
		Average individual dose ALARA target < 5 mSv/a	Underground areas: Average = 5.1 mSv	Not Achieved	Although above the limit, this is a major improvement from the previous year's figure of 16.3 mSv
			All surface areas: Average = 0.54 mSv	Achieved	
	Public dose (Necsa) (Limit – 1 mSv/a)	Necsa NNR ALARA target of 0.050 mSv/a	0.0080 mSv/a	Achieved	These dose values are based on calculated annual estimations (calendar year). They are not actual dose values received by members of the public The values reported are for period January 2006 to December 2006
		Vaalputs ALARA target of 0.005 mSv/a	0. 00 mSv/a	Achieved	The value of 0.00 mSv is based on the fact that no critical groups exist in the immediate vicinity of Vaalputs, and the limited discharges from Vaalputs
	Worker dose	Necsa (Limit < 50 mSv/a)	15.6 mSv/a	Achieved	The values reported are for period January 2006 to December 2006
		Necsa Average individual dose ALARA target of 5 mSv/a	0.6 mSv/a	Achieved	The values reported are for period January 2006 to December 2006
		Vaalputs NNR ALARA limit on maximum individual dose of 20 mSv/a	1.0 mSv/a	Achieved	The values reported are for period January 2006 to December 2006
		Vaalputs Average individual dose NNR ALARA target 5 mSv/a	0.6 mSv/a	Achieved	The values reported are for period January 2006 to December 2006
To ensure a holistic compliance assurance approach including safety culture enhancement **(CB3)**	Holistic compliance assurance system including safety culture enhancement programme developed and implemented	Compliance index > 80 %	Koeberg: 95 %	Achieved	Compliance index is based on the findings of the inspections of the NNR compliance assurance programme which are ranked in terms of their safety significance
			RENS: 81 %	Achieved	
			NTWP: 99 %	Achieved	

19 Report on Performance against Objectives (continued)

Objectives	Key Performance Indicator	Target	Actual	Performance Results	Notes, Challenges, Comments
	Strategy for regulatory control (standard, assessment, compliance inspection) over physical security measures developed and implemented	KP Physical security compliance report	100 %	Achieved	
		Internal processes and NNR requirements developed	Internal processes document completed	Achieved	
		Report on the Design Basis Threat (DBT) for authorised facilities	Report	Not achieved	Report delayed due to lack of progress by key stakeholders in producing updated DBT. Regular feedback of status of project has been given to the NNR security team meetings
		Report on status of physical security at Pelindaba	Report	Achieved	
		Report on status of physical security at Vaalputs	Report	Achieved	
	Report on the above to the Board	Report to Board	Status report on compliance assurance provided in the Executive report to the Board	Achieved	
To review and implement the current legislation (NNRA), update the associated regulatory rules, and continuously monitor SA's legislative environment **(CB4)**	Processes for scanning legislative changes and ensuring NNR compliance to relevant legislation are reviewed and implemented	Establish process for scanning changes and a system for review and compliance	Process and system for scanning and compliance review has been established and implemented	Achieved	
	Report to the Board on implementation and compliance with legislation relevant to the South African environment, and co-operating with other organs of state as per the NNR Act	Identify provisions of NNR Act which require amendment	Provisions requiring amendments were identified	Achieved	
		Workshop with the Board to deliberate on the proposed amendments	Workshops were conducted	Achieved	
		Prepare document with proposed wording for amended Act	Document with amendments to NNR Act has been prepared	Achieved	
		Workshop with Board and identified stakeholders	Workshop with identified stakeholders is being arranged	N/A	Overtaken by events. The workshop will no longer be held. Recommendation for amendment to the legislation will be forwarded to the Minister of Minerals and Energy for consideration
To review conditions of authorisation **(CB5)**	To update CORs issued to all holders to be in line with revised conditions of authorisation	All CORs updated (variations)	Conditions of authorisation developed	Not Achieved	Conditions of authorisation have been developed The update of the CORs will be completed by January 2008
	Progress process-based licensing approach for Necsa	Review all PBL submissions within agreed timeframes	Reviewed reports	Achieved	

Objectives	Key Performance Indicator	Target	Actual	Performance Results	Notes, Challenges, Comments
		NTWP Update authorisations in line with approved PBL submissions and relevant statutory requirements	Updated authorisations	Achieved	
	Updated authorisations issued to all holders	KP Update authorisations in line with approved process-based licence submissions and relevant statutory requirements	N/A	N/A	No changes were necessary to be made to the Koeberg Licence NL-1
	Report to the Board on the above	Report to the Board	Reported to the Board as part of the Executive Report	Achieved	
To fulfil relevant national obligations in respect of international legal instruments **(CB6)**	Processes for scanning developments and changes of international instruments updated and implemented	Processes for scanning developments and changes of international instruments updated and implemented	Documented system on process for scanning developments and changes of international instruments	Achieved	
	A report to the Board indicating changes, and developments of international instruments and fulfilment of existing obligations	Report to the Board indicating changes, and developments of international instruments and fulfilment of existing obligations	Report on the fulfilment of the obligations in terms of the Convention on Nuclear Safety produced	Achieved	No changes to existing instruments and no new instruments have been introduced
	To prepare quarterly reports on all of the above including explanations on objectives not achieved	Quarterly reports	Reported as part of the Executive Report to the Board	Achieved	
To ensure that relevant nuclear authorisation holders have adequate nuclear emergency planning in place **(CB7)**	Regulatory requirements which are in line with international best practice for emergency planning developed and issued to relevant authorisation holders	Regulatory requirements developed and issued to authorisation holders	NNR requirements on emergency planning "RD-0014" developed and issued to Koeberg and Necsa	Achieved	NNR requirements document RD 0014 is in line with and is based on IAEA standards on emergency preparedness
	Nuclear emergency planning provisions, e.g. emergency plans in place at all relevant authorisation holders	Emergency plans in place at all nuclear installations and relevant holders of certificates of registration	Emergency plans at nuclear installations in place and implemented	Achieved	
			Emergency arrangements for NUFCOR transport actions in place and implemented	Achieved	
	Report to the Board on adequacy of emergency preparedness arrangements for relevant authorisation holders reviewed and tested	Report to Board	Report on the Emergency Exercises at Koeberg and Necsa included in the Executive Report to the Board	Achieved	

19 Report on Performance against Objectives (continued)

Objectives	Key Performance Indicator	Target	Actual	Performance Results	Notes, Challenges, Comments
Reviewing safety standards and regulatory practice including investigations. Specifically, the NNR needs to purchase laboratory equipment in order to enhance its capabilities with regard to independent verifications **(CB8)**	Safety standards and regulatory practices for compliance with legislation and international best practice reviewed and submitted to the Executive Authority for promulgation	Regulatory documents aligned with new safety standards	Plan to align with regulation on safety standards has been compiled and relevant documents have been identified and are being updated accordingly	Not Achieved	All relevant regulatory documents will be updated by September 2007
	Investigations (regulatory research) conducted on the following:				
	Evaluation of extent of contamination of national water resource, Wonderfonteinspruit	Research report	Report	Not Achieved	This work is 95 % complete. The final report has been submitted to the NNR by the Consultants and is under review. The document will be finalised by end of May 2007
	Epidemiological studies around authorised facilities for nuclear installations	Research report	A report on the review on literature survey	Not Achieved	A literature survey report that will form the basis for the NNR review of the Epidemiological studies which will be conducted under the PBMR EIA has been produced
	Cango Caves investigations	Report on Cango Caves investigations	Report	Achieved	
	Enhance Laboratory instrumentation	Upgraded Laboratory	Project plan to update the laboratory	Not Achieved	A feasibility study to determine the strategy for upgrading the laboratory is currently in progress
	Rehabilitation of the Karoo Sites	Report on Karoo Investigations	Report	Not Achieved	Overtaken by events. Project terminated due to area now under prospecting and mining. Close out report has been produced
	Financial liability	Research report on financial liability	Report on financial liability	Not Achieved	This work is 45 % complete. Report has been submitted by the consultant contracted to carry out Phase I of this study which was focused on the Koeberg Nuclear Power Station and is being reviewed. The NNR has identified that further information is required to finalise the study and report. Phase II will focus on the application to Necsa
	NNR fundamental principles and guidelines produced on the following:				
	Research reactor core conversion and upgrades	Research reactor core conversion and upgrades	Report on research reactor core conversion and upgrades	Achieved	
	Decommissioning	Research report on fundamental principles on decommissioning	Report on decommissioning	Achieved	
	Optimal reduction of radioactive waste	Report on optimal reduction of radioactive waste	Document Preparation Plan (DPP) and draft report produced	Not Achieved	This work is 70 % complete. DPP for the project and the draft report have been produced. The report will be finalised by end of August 2007
	Plant life extension	Plant life extension	Report on plant life extension produced	Achieved	
	Protection of environment against nuclear damage	Report on protection of environment against nuclear damage	Status report on international development on the protection of environment	Not Achieved	Status report on international development work will be available by the end of April 2007

B. Stakeholder Satisfaction

Objectives	Key Performance Indicator	Target	Actual	Performance Results	Notes
To ensure effectiveness of all bilateral agreements and other international collaborations (SS1)	Participated in existing bilateral forums including activities and international collaborations	Participation in forums and international collaborations	NNR staff continued to participate in international forums	Achieved	NNR personnel participated during the period in IAEA safety committee meetings, conferences, bilateral meeting with the French regulator DGSNR and other multilateral meetings (NERS, MDEP, etc). Reports were produced
	Reports to the Board	Report to Board	Report of participation in local and international forums provided in the Executive report to the Board	Achieved	
To improve stakeholder relations management including public education (SS2)	Reviewed and implemented communication strategic plan to improve NNR image and public confidence	Revised and aligned communication strategy and plans	A revised strategy and plans have been approved	Achieved	
	Approved final communication and plans	Approved communication strategy and plans	Approved communication strategy and plans	Achieved	
		Quarterly reports on the implementation of the plans	Produced quarterly report	Achieved	
	NNR publications (annual report, Tsebo, any other technical publication) including the website	Printed NNR annual report and tabled in Parliament 2005/6	Printed and tabled NNR Annual report	Achieved	
		Printing of NNR quarterly newsletters	Quarterly publications	Achieved	
		Update /maintenance of NNR Website	Quarterly updates	Achieved	
		Annual report on the implementation of PAIA	Annual report	Not achieved	The report will be completed end of April 2007
	To establish mechanism to comply with the whistle blower imperatives	Documents on policy, strategy and plan produced	Policy document, strategy and plan	Achieved	
	Contribute to social sustainability	Progress report on the implementation of the procedure	Quarterly report produced.	Achieved	

C. Internal Business Processes

Objectives	Key Performance Indicator	Target	Actual	Performance Results	Notes
To improve business and regulatory practices (structure, systems and processes) (**IBP1**)	NNR structure, internal business systems and processes reviewed for effectiveness and efficiency and output thereof implemented such that:				
	Security and disaster management processes developed and implemented	Security and disaster management processes developed and implemented	Processes developed but not implemented	Not Achieved	Revised ICT strategy has been approved. Objectives will now be implemented according to a 3-year plan
	Self-assessment of regulatory effectiveness based on IAEA RaSSia/IRRT methodology conducted	Self Assessment tool developed by March 2007	Self Assessment tool developed	Achieved	
		Implementation of the self assessment tool by March 2009	Preliminary self assessment completed and documented	On target	Preliminary self assessment did not cover all the areas of NNR activities. Self assessment will be extended to the remaining areas. The implementation of recommendations will follow
	Improved structure, systems and processes implemented	Improved structure systems and processes implemented	Structure designed and approved but not implemented	Not achieved	Implementation of the structure will be subject to the conclusion of the consultation process with recognised union
	Quality management system developed and implemented	Quality management system developed and implemented	Framework of QMS system developed	Not achieved	The activity has been revised. The following are the milestones: 50% of integrated management system will be implemented by 2008. The system will be fully implemented by 2010.
	Report to the Board	Report to Board	Report	Achieved	
To enter into institutional agreements (**IBP2**)	Reviewed and implemented processes for concluding and implementing co-operative governance agreements with other organs of state	Conclude and ensure implementation of co-operative governance agreements with organs of state	Co-operative agreements are at various stages of completion	Not Achieved	• 6 out of 11 agreements have been completed and submitted to the Minister. • 1 agreement is in the final stages before forwarding to Minster. • 1 agreement is being commented on by public • 3 are in pre-initial public comment stage
	All necessary co-operative agreements with other organs of state concluded and implemented	Concluded agreements	Report	Not Achieved	As above. Status report provided to Board
	Report to the Board	Report	Report	Achieved	
To implement the NNR transformation policy and plan (**IBP3**)	Reviewed, updated and implemented transformation plan in keeping with legislative imperatives and best practices	Revised transformation plan implemented	Report outlining how the revised transformation plan will be implemented has been completed	Not achieved	At the conclusion of the current restructuring, a revised transformation plan will be produced reflecting all the revived policies and setting milestones for other transformation deliverables



Objectives	*Key Performance Indicator*	*Target*	*Actual*	*Performance Results*	*Notes*
	Report to the Board	Report	Report	Achieved	
To improve NNR corporate governance (**IBP4**)	Reviewed, updated and implemented corporate governance manual against King II and international best practice	Produce corporate governance manual	Produced document on corporate governance	Achieved	
	Report to Board	Report	Report	Achieved	
To improve the NNR nuclear emergency preparedness and response (**IBP5**)	Reviewed, improved, and implemented NNR internal emergency preparedness and response	NNR emergency centre equipped and response procedures developed	Emergency centre equipped, and procedures in place	Achieved	
	Peer review on the adequacy of NNR emergency preparedness conducted	Peer review report	Report	Not achieved	Discussions were held with French regulator and project plan for review to be drafted. To be conducted in next 2007-08 FY
	Report to the Board on the efficiency and adequacy of NNR emergency preparedness and response	Report to Board	Status of the NNR emergency response included in the Executive report to the Board	Achieved	
		Report on processes and systems for emergency response	Progress report	Achieved	

D. Human Resources

Objectives	Key Performance Indicator	Target	Actual	Performance Results	Notes
Implementing a holistic HR management strategy that will enhance the attraction and retention abilities of the Regulator (**HR1**)	Human Resources strategy reviewed and implemented to improve NNR's ability to retain and attract staff	Human Resources strategy reviewed and implemented to improve NNR's ability to retain and attract staff	Key elements of the strategy have been completed	Not achieved	Main elements of the strategy are now completed, namely: • Job profiles and competencies have been updated • Performance management system completed, • Remuneration system completed • Dual career path system developed Implementation will follow Board approval
	Report to the Board	Report to the Board	Reported to the Board through quarterly reports	Achieved	
To realign policies, procedures and practices with SA legislation, best practice and transformation imperatives (**HR2**)	Revised organisational policies and procedures in line with national legislation, best practice and transformation plan	Revised organisational policies and procedures in line with national legislation, best practice and transformation plan	Work in progress, the review of the HR project is not yet complete	Not achieved	Condition of services, disciplinary code, and grievance procedure and migration guide has been revised and are subject to the consultation process that will commence at the end of April 2007. The rest of the policies revision will be completed in June 2007
	Implemented revised policies and procedures	Implement revised policies and procedures	Work in progress, the review of the HR project is not yet complete	Not achieved	Implementation to commence after completion of revision process as above
	Report to the Board	Report to the Board through quarterly reports	Quarterly reports	Achieved	
To implement capacity building and development within the organisation and taking part in national capacity building initiatives (**HR3**)	Organisational capacity: Revised and implemented skills development based on personnel development plans for each staff member to ensure that the Regulator has competent staff to execute its mandate	Revised and implemented personnel development plans for staff members (PDPs)	PDPs have been revised. Implementation is being/will be implemented up to March 2007	Achieved	
		Revised and implemented personnel development plans for staff members (PDPs)	PDPs have been updated for implementation	Achieved	
	Developed and implemented a regulatory training programme	Develop and implement a regulatory training programme	• Inspector training manual • Arecsa and NNR training catalogue and plan • Secondment programme developed	Achieved	
	Report to the Board	Report to Board	Reported to the Board	Achieved	

Objectives	Key Performance Indicator	Target	Actual	Performance Results	Notes
	External capacity: Participated in national capacity development initiatives for the nuclear industry including universities and student supervision	Report on intern supervision	Mentoring provided to interns	Achieved	
		Report on research student supervision	Four PRD achieved: One MSc student being supervised in the KP and in the PBMR Programme + one intern at the KP being seconded to Koeberg Nuclear Power Station until December 2006 for training	Achieved	
	Report to the Board	Quarterly report	Report provided in the Executive report to the Board	Achieved	
To leverage strategic partnerships and alliances to further the technical expertise of NNR staff **(HR4)**	To leverage strategic partnerships and alliances to further the technical expertise of NNR staff	To leverage strategic partnerships and alliances to further the technical expertise of NNR staff	Participated in national capacity development initiatives for the nuclear industry including universities, student supervision and international forums	Achieved	
	Report to the Board	Report to the Board	Reported to the Board through quarterly reports	Achieved	
To adequately staff the NNR to execute its mandate. **(HR5)**	Reviewed adequacy of staff complement to execute NNR's mandate in line with environmental changes	Reviewed adequacy of staff complement to execute NNR's mandate in line with environmental changes	NNR structure has been reviewed and approved by the Board	Achieved	Review of the NNR structure was based on the needs/ skills analysis informed by environmental changes and value chain of the NNR. Implementation of the structure will be subject to the conclusion of the consultation process with recognised union
	Report to the Board	Report to the Board	Reported to the Board through quarterly reports	Achieved	

Annual Financial Statements

20.1 Statement of Financial Position as at 31 March 2007

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	notes	2007 R	2006 R
Assets			
Non-current assets			
Property and equipment	2	**2,015,542**	2,200,436
Retirement benefit asset	5	**-**	-
Current assets		**73,797,177**	53,498,186
Trade and other receivables	3	**7,854,526**	2,514,562
Cash and cash equivalents	12.2	**65,942,651**	50,983,624
		75,812,719	55,698,622
Equity and liabilities			
Reserves			
Accumulated surplus / (deficit)		**23,986,219**	5,176,661
Non-current liabilities			
Retirement medical benefits	5	**29,718,000**	27,937,000
Current liabilities		**22,108,500**	22,584,961
Trade and other payables		**1,567,522**	1,884,142
Provisions	6	**2,540,978**	2,700,819
Deferred income - DME Grant	14	**18,000,000**	18,000,000
		75,812,719	55,698,622

20.2 Statement of Financial Performance for the year ended 31 March 2007

	notes	2007 R	2006 R
Operating income	7.1	**68,197,464**	53,255,775
Operating expenses		**(53,749,139)**	(52,270,822)
Operating surplus		**14,448,325**	984,953
Interest received		**4,361,233**	2,770,863
Net surplus for the year		**18,809,558**	3,755,816

20.3 Statement of Changes in Net Assets for the year ended 31 March 2007

	Accumulated surplus/ (deficit) R
Balance at 31 March 2005	**1,420,845**
Surplus for the period	3,755,816
Balance at 31 March 2006	**5,176,661**
Surplus for the period	18,809,558
Balance at 31 March 2007	**23,986,219**

20.4 Cash Flow Statement for the year ended 31 March 2007

	notes	2007 R	2006 R
Cash flow from operating activities		**15,587,723**	14,174,154
Cash receipts from authorisation holders and applicants		**62,857,500**	60,474,699
Cash paid to suppliers and employees		**(51,631,010)**	(49,071,408)
Cash generated from operations	12.1	**11,226,490**	11,403,291
Interest received		**4,361,233**	2,770,863
Cash flow from investing activities			
Acquisition of equipment		**(628,697)**	(1,008,713)
Net increase in cash and cash equivalents		**14,959,026**	13,165,441
Cash and cash equivalents at beginning of the period		**50,983,624**	37,818,183
Cash and cash equivalents at end of the period	12.2	**65,942,650**	50,983,624

20.5 Notes to the financial statements for the year ended 31 March 2007

1 *Accounting policy*

The financial statements have been prepared in accordance with the South African Statements of Generally Accepted Accounting Practices (GAAP) including any interpretations of such Statements issued by the Accounting Practices Board, with the effective Standards of Generally Recognised Accounting Practices (GRAP) issued by the Accounting Standards Board replacing the equivalent GAAP Statement as follows:

Standard of GRAP	**Replaced Statement of GAAP**
GRAP 1: Presentation of financial statements	AC101: Presentation of financial statements
GRAP 2: Cash flow statements	AC118: Cash flow statements
GRAP 3: Accounting policies, changes in accounting estimates and errors	AC103: Accounting policies, changes in accounting estimates and errors

Currently the recognition and measurement principles in the above GRAP and GAAP Statements do not differ or result in material differences in items presented and disclosed in the financial statements. The implementation of GRAP 1, 2 and 3 has resulted in the following changes in the presentation of the financial statements:

Terminology differences:

Standard of GRAP	**Replaced Statement of GAAP**
Statement of financial performance	Income statement
Statement of financial position	Balance sheet
Statement of changes in net assets	Statement of changes in equity
Net assets	Equity
Surplus/deficit	Profit/loss
Accumulated surplus/deficit	Retained earnings
Contributions from owners	Share capital
Distributions to owners	Dividends

The cash flow statement can only be prepared in accordance with the direct method.

Specific information has been presented separately on the statement of financial position such as:

a. Receivables from non-exchange transactions, including taxes and transfers;

b. Taxes and transfers payable;

c. Trade and other payables from non-exchange transactions;

Amount and nature of any restrictions on cash balances is required.
Paragraphs 11 – 15 of GRAP 1 have not been implemented due the fact that the budget reporting standard has not been developed by the local standard setter and the international standard is not effective for this financial year. Although the inclusion of budget information would enhance the usefulness of the financial statements, non-disclosure will not affect the objective of the financial statements.

1.1 Basis of preparation
The financial statements have been prepared on the historical cost basis.

1.2 Going concern assumption
The financial statements have been prepared on a going concern assumption and will continue in operation for the forseeable future.

1.3 Events after the balance sheet date
No events after the balance sheet date either adjusting or non adjusting have come to our attention.

1.4 Revenue recognition
Revenue is recognised when it is probable that future economic benefits will flow to the enterprise and these benefits can be measured reliably. Revenue comprises of authorisation fees and other special projects. Revenue arising from authorisation fees is recognised on an accrual basis in accordance with the substance of the relevant agreements.

1.5 *Irregular, fruitless and wasteful expenditure*

Irregular expenditure means expenditure incurred in contravention of, or not in accordance with, a requirement of any applicable legislation, including the PFMA. Fruitless and wasteful expenditure means expenditure that was made in vain and would have been avoided had reasonable care been exercised. All irregular fruitless and wasteful expenditure is charged against income in the period in which it is incurred.

1.6 *Retirement benefit cost*

The NNR operates both a defined benefit plan in respect of post-retirement medical aid contributions as well as in respect of the pension fund. The defined benefit plans are subject to an annual actuarial valuation. The net actuarial losses of the current period and past service cost of the current period to the extent that they exceed any reduction in the present value of the economic benefits available in the form of refunds from the plan or reduction in future contributions to the plan. If there is no change or an increase or decrease in the present value of the economic benefits, the entire net actuarial losses of the current period and past service cost of the current period shall be recognised immediately in the income statement. Payments to the defined contribution benefit plan are charged to the income statement in the year to which they relate.

1.7 *Foreign currencies*

Transactions in foreign currencies are accounted for at the rates of exchange ruling on the date of the transactions. Gains and losses arising from the settlement of such transactions are recognised in the income statement.

1.8 *Property and equipment*

Property and equipment except for land are stated at historical cost less depreciation. Depreciation is calculated on the straight-line method to write off the cost of each asset over its estimated useful life:

Property - land	Not depreciated
Property - buildings	20 years
Office furniture	10 years
Office equipment	5 years
Computer equipment	3 years
Scientific and technical equipment	5 years
Computer software	3 years

1.9 *Leasing*

Leases under which the risks and benefits of ownership are effectively retained by the lessor are classified as operating leases. Obligations incurred under operating leases are charged to the income statement in equal instalments over the period of the lease.

1.10 *Financial instruments*

Recognition

Financial assets and financial liabilities are recognised on the NNR's balance sheet when the NNR becomes a party to the contractual provisions of the instument.

Financial Assets

The NNR's principle financial assets are accounts receivable and cash and cash equivalents.

Trade Receivables

Trade receivables are stated at their nominal value as reduced by appropriate allowances for estimated irrecoverable amounts.

Trade payables

Trade and other payables are stated at their nominal value.

Cash and cash equivalents

Cash and cash equivalents are measured at fair value.

1.11 *Provisions*

Provisions are recognised when the NNR has a present obligation as a result of past events, and it is probable that this will result in an outflow of economic benefits that can be estimated reliably.

1.12 *Interest received*

Interest is recognised on a time proportionate basis with reference to the principal amount receivable and the effective interest rate applicable.

1.13 *Comparative figures*

Where necessary, comparative figures have been adjusted to conform to changes in the presentation in the current year.

1.14 *Impairment*

At each balance sheet date, NNR reviews the carrying amounts of its tangible assets to determine whether there is any indication that those assets may be impaired. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any).

1.15 *Government grant received*

Government grants are recognised as income on a systematical basis over the period necessary to match the grants with the related costs which they are intended to compensate.

2 Property and equipment

		2007			2006		
		Cost	Accumulated Depreciation	Book value	Cost	Accumulated Depreciation	Book value
		R	R	R	R	R	R
2.1	*Carrying amount as at the beginning of year*	**11,462,945**	**(9,262,509)**	**2,200,436**	**10,557,038**	**(8,452,648)**	**2,104,390**
	Furniture	1,031,578	(537,198)	494,380	756,794	(450,114)	306,680
	Office equipment	1,044,677	(728,922)	315,755	983,489	(628,359)	355,130
	Computer equipment	4,917,387	(4,364,165)	553,222	4,634,453	(4,028,010)	606,443
	Scientific and technical equipment	2,528,891	(2,327,568)	201,323	2,493,852	(2,259,389)	234,463
	Computer software	1,512,912	(1,219,487)	293,425	1,260,950	(1,012,294)	248,656
	Property - Buildings	213,750	(85,169)	128,581	213,750	(74,482)	139,268
	Property - Land	213,750	-	213,750	213,750	-	213,750
2.2	*Additions*	**628,696**	**-**	**628,696**	**1,008,713**	**-**	**1,008,713**
	Furniture	50,562	-	50,562	274,633	-	274,633
	Office equipment	6,201	-	6,201	37,947	-	37,947
	Computer equipment	273,522	-	273,522	287,683	-	287,683
	Scientific and technical equipment	-	-	-	156,488	-	156,488
	Computer software	298,410	-	298,410	251,962	-	251,962
	Property - Buildings	-	-	-	-	-	-
	Property - Land	-	-	-	-	-	-
2.3	*Disposals / adjustments*	**(32,637)**	**-**	**(32,637)**	**(102,806)**	**(333)**	**(103,139)**
	Furniture	(851)	-	(851)	151	(351)	(200)
	Office equipment	(1,029)	-	(1,029)	23,241	4,545	27,786
	Computer equipment	(30,756)	-	(30,756)	(4,749)	(5,305)	(10,054)
	Scientific and technical equipment	-	-	-	(121,449)	778	(120,671)
	Computer software	-	-	-	-	-	-
	Property - Buildings	-	-	-	-	-	-
	Property - Land	-	-	-	-	-	-
2.4	*Depreciation*	**-**	**(780,953)**	**(780,953)**	**-**	**(809,528)**	**(809,528)**
	Furniture	-	(82,700)	(82,700)	-	(86,733)	(86,733)
	Office equipment	-	(93,119)	(93,119)	-	(105,108)	(105,108)
	Computer equipment	-	(294,631)	(294,631)	-	(330,850)	(330,850)
	Scientific and technical equipment	-	(58,756)	(58,756)	-	(68,957)	(68,957)
	Computer software	-	(241,060)	(241,060)	-	(207,193)	(207,193)
	Property - Buildings	-	(10,688)	(10,688)	-	(10,687)	(10,687)
	Property - Land	-	-	-	-	-	-
2.5	*Carrying amount as at the end of year*	**12,059,004**	**(10,043,462)**	**2,015,543**	**11,462,945**	**(9,262,509)**	**2,200,436**
	Furniture	1,081,289	(619,898)	461,391	1,031,578	(537,198)	494,380
	Office equipment	1,049,849	(822,041)	227,807	1,044,677	(728,922)	315,755
	Computer equipment	5,160,153	(4,658,796)	501,358	4,917,387	(4,364,165)	553,222
	Scientific and technical equipment	2,528,891	(2,386,324)	142,567	2,528,891	(2,327,568)	201,323
	Computer software	1,811,322	(1,460,547)	350,776	1,512,912	(1,219,487)	293,425
	Property - Buildings	213,750	(95,857)	117,894	213,750	(85,169)	128,581
	Property - Land	213,750	-	213,750	213,750	-	213,750

The property (land and building) consists of an office block situated on erf 3187 Melkbosch Strand in the Blaauberg Municipality, Cape Division, Western Cape Province.

3 Trade and other receivables

	2007 R	2006 R
Trade receivables	**7,134,759**	3,071,641
Less: Provision for doubtful debts	**(394,340)**	(1,053,887)
	6,740,419	2,017,754
Other receivables	**1,114,107**	496,808
Net trade receivables	**7,854,526**	2,514,562

Trade receivables are measured at amortised cost using the effective interest rate in terms of Par 9 of IAS 39. The difference between the fair value and carrying amount is treated as interest received in accordance with the statement.

4 Bank balances and cash

Bank balances and cash comprise cash. The carrying amount approximates to its fair value.

5 Retirement benefits

Post-retirement medical benefits

The NNR has made provision for a medical aid scheme covering employees who were in its employ on or before 1 July 1990 and who retire from its service. The NNR has also made provision to cover a portion of the subscription to the medical scheme in respect of those members of staff who joined the NNR between 1 July 1990 and 31 December 1995 and who retire from its service.

Post-retirement pension benefit

The NNR has made provision for a pension scheme covering all its permanent employees. The funds are governed by the Pension Funds Act, 1956 as amended.

The defined benefit schemes are valued actuarially at an interval of not more than 3 years using the projected unit credit method. The schemes were last actuarially valued during March 2007. In arriving at his conclusion, the actuary took into account the following assumptions at balance sheet date (expressed as weighted averages):

	Defined benefit pension plan		Post-employment medical benefit	
	2007	2006	2007	2006
Discount rate at 31 March 2007	**7,7%**	7,4%	**7,7%**	7,4%
Expected return on plan assets at 31 March 2007	**9.00%**	8,4%	**9.00%**	8,1%
Annual increase in health care costs	**8.00%**	8.00%	**8,0%**	7,6%

The defined benefit plans are actuarially valued at an interval of not more than three years and was last actuarially valued at 31 March 2007.

The amount included in the balance sheet arising from the NNR obligation in respect of the defined retirement benefit plans are as follows:

	Defined benefit pension plan		Post-employment medical benefit	
	2007 R	2006 R	2007 R	2006 R
Employee benefit obligations				
Amounts recognised in the balance sheet				
Present value of funded obligations	**46,920,000**	43,880,000	**29,718,000**	27,937,000
Fair value of plan assets	**(76,699,000)**	(62,267,000)	**-**	-
	(29,779,000)	(18,387,000)	**29,718,000**	27,937,000
Unrecognised actuarial loss	**(1,650,000)**	(3,871,000)	**-**	-
Unrecognised post employment benefit asset	**31,429,000**	22,258,000	**-**	-
Net liability in balance sheet	**-**	-	**29,718,000**	27,937,000

5 *Retirement benefits (continued)*

	Defined benefit pension plan		Post-employment medical benefit	
	2007 R	2006 R	2007 R	2006 R
Movements in the defined benfit obligation is as follows:				
Beginning of the year	**43,880,000**	36,261,000	**27,937,000**	25,315,000
Interest cost	**3,182,000**	2,865,000	**1,781,000**	2,622,000
Current service cost	**4,604,000**	4,028,000	**-**	-
Benefits paid	**(6,396,000)**	(3,145,000)	**-**	-
Actuarial loss	**1,650,000**	3,871,000	**-**	-
	46,920,000	43,880,000	**29,718,000**	27,937,000
Movements in plan assets is as follows:				
Beginning of the year	**62,267,000**	42,557,000	**-**	-
Expected return	**5,183,000**	3,302,000	**-**	-
Contributions	**5,251,000**	4,968,000	**-**	-
Benefits paid	**(6,396,000)**	(3,145,000)	**-**	-
Acturial gain on assets	**10,394,000**	14,585,000	**-**	-
	76,699,000	62,267,000	**-**	-

The effects of a 100 basis point increase or decrease in medical inflation assumption will show the following results:

Accrued liabilities

Assumption	Variation	Total accrued liability R	% change in total accrued liability
Medical inflation	+100 basis pionts	34,572,000	16.30%
	-100 basis pionts	25,835,000	13.10%

6 *Accruals*

	Leave pay accruals R	Bonus accruals R	Total R
Opening balance	2,133,886	566,932	2,700,818
Additional provision	-	37,161	37,161
Utilisation of provisions	(197,000)	-	(197,000)
Closing balance	1,936,886	604,093	2,540,978

7 *Operating surplus*

	notes	2007 R	2006 R
Operating surplus is stated after taking into account the following:			
7.1 Operating income			
7.1.1 Revenue		**53,455,464**	47,824,884
Authorisation fees		**53,271,958**	47,646,569
Other		**183,506**	178,315
State contributions	11	**14,742,000**	5,417,000
7.1.2 Foreign exchange gain		**-**	13,891
Total operating income		**68,197,464**	53,255,775

7 Operating surplus (continued)

	notes	2007 R	2006 R
7.2 Expenditure			
7.2.1 Auditor's remuneration		**444,070**	379,955
Audit fees			
- current year		**444,070**	379,955
- prior year		**-**	-
Expenses			
- current year		**-**	-
- prior year		**-**	-
7.2.2 Depreciation		**780,953**	809,528
Office furniture		**82,700**	86,733
Office equipment		**93,119**	105,108
Computer equipment		**294,631**	330,850
Scientific and technical equipment		**58,756**	68,957
Computer software		**241,060**	207,193
Property - buildings		**10,688**	10,687
7.2.3 Fees for services		**1,990,894**	2,186,500
Technical services		**767,676**	781,061
Administration services		**793,404**	1,053,769
Internal audit and services		**429,814**	351,670
7.2.4 Directors' emoluments	9	**316,378**	464,433
Service fee		**316,378**	464,433
Expenses		**-**	-
7.2.5 Staff costs		**36,709,987**	35,805,785
Salaries, allowances and annual payments		**33,255,274**	31,613,353
Included in staff costs are:			
Defined benefit plan expenses		**5,251,000**	4,968,000
- current service cost		**4,604,000**	4,028,000
- interest cost		**3,182,000**	2,865,000
- return on assets		**(5,183,000)**	(3,302,000)
- actuarial gain recognised		**(6,523,000)**	(10,714,000)
- reversal of prior year un-recognised post-employment benefit asset		**(22,258,000)**	(10,167,000)
- Unrecognised post employment benefit asset		**31,429,000**	22,258,000
- Post-retirement medical benefit		**1,781,000**	2,622,000
- Post-retirement medical benefit		**1,781,000**	3,524,847
- Change in accounting estimate (Being change in past services cost, non-vested benefits)		**-**	(902,847)
7.2.6 Loss on scrapping of assets		**32,637**	103,140
7.2.7 Bursaries		**27,782**	141,301
7.2.8 Operating leases		**3,444,903**	3,071,709
Office building		**2,212,053**	2,406,091
Equipment		**793,404**	636,396
Vehicles		**40,973**	29,222

8 Special Project

In terms of section 5(b)(i) of the NNR Act (Act No 47 of 1999) the Regulator should exercise regulatory control related to safety over the siting, design, construction, operation, manufacture of component parts, and decontamination, decommissioning and closure of nuclear installations. In compliance with the aforegoing during the financial year the NNR had an arrangement with Eskom, the applicant for the Pebble Bed Modular Reactor nuclear installation licence, for certain fees, disbursements and expenses necessarily incurred and not provided for in the licence application fee as contemplated in section 28 of the NNR Act project. The full income and expenditure associated with the project has been:

Income from Eskom	**31,648,145**	21,719,057
Expenditure (Foreign consultants)	**31,648,145**	21,719,057

9 *Directors' and executive staff emoluments*

For the year ended 31 March 2006	Months in service	Salaries/ fees	Bonuses	Pension contribu-tions	Other contribu-tions	Total
		R	R	R	R	R
Non-Executive Directors						
Prof K Bharuth-Ram	12	61,479	-	-	-	61,479
Mr D Elbrecht	12	40,584	-	-	-	40,584
Rev P Grove	12	15,219	-	-	-	15,219
Dr T Lesoli	12	49,039	-	-	-	49,039
Ms TNM Mashanda	12	15,219	-	-	-	15,219
Ms TN Mgoduso	12	57,990	-	-	-	57,990
Adv BM Mkhize	12	77,786	-	-	-	77,786
Mr AHCH Motaung	12	47,348	-	-	-	47,348
Dr J M Stewart	12	82,859				82,859
		447,523	-	-	-	447,523

Note: These emoluments are for all directors, including existing as well as past directors. Certain members participated in various other Board committees

Independent member						
Ms SN Mabaso	7	16,910	-	-	-	16,910
		16,910	-	-	-	16,910
Executive Director						
Mr MT Magugumela (CEO)	12	756,611	-	-	-	756,611
		756,611	-	-	-	756,611
Executive staff						
Mr GA Clapisson	12	476,993	49,973	77,299	27,952	632,217
Mr J Mabaso	11	398,274	24,850	63,529	23,534	510,187
Mr KE Mkhize	7	270,380	6,638	42,747	22,093	341,858
Mr AE Muller	12	447,003	24,134	66,913	23,597	561,647
Mr CO Phillips	12	476,993	27,880	77,300	25,970	608,143
Dr AS Tsela	12	476,993	59,441	77,300	30,607	644,341
		2,546,636	192,916	405,088	153,753	3,298,393

For the year ended 31 March 2007						
Non-Executive Directors						
Prof K Bharuth-Ram	8	50,274	-	-	-	50,274
Mr D Elbrecht	12	31,440	-	-	-	31,440
Rev P Grove	12	15,720	-	-	-	15,720
Dr T Lesoli	8	21,615	-	-	-	21,615
Ms TNM Mashanda	8	3,930	-	-	-	3,930
Ms TN Mgoduso	12	46,559	-	-	-	46,559
Adv BM Mkhize	12	37,335	-	-	-	37,335
Mr AHCH Motaung	8	21,615	-	-	-	21,615
Dr J M Stewart	8	33,405	-	-	-	33,405
Mr K Govender	4	7,860	-	-	-	7,860
Prof MA Hermanus	4	10,584	-	-	-	10,584
Mr WN Lesufi	4	11,790	-	-	-	11,790
Mr BA Ramahlo	4	7,860	-	-	-	7,860
Prof D Van der Merwe	4	7,860	-	-	-	7,860
		307,847	-	-	-	307,847

Note These emoluments are for all directors, including existing as well as past directors. Certain members participated in various other Board committees

9 Directors' and executive staff emoluments (continued)

For the year ended 31 March 2007	Months in service	Salaries/ fees	Bonuses	Pension contribu-tions	Other contribu-tions	Total
		R	R	R	R	R
Independent Member						
Ms SN Koyana	8	8,531	-	-	-	8,531
		8,531	-	-	-	8,531
Executive Director						
Mr MT Magugumela (CEO)	12	762,969	-	-	-	762,969
		762,969	-	-	-	762,969
Executive staff						
Mr GA Clapisson	12	508,653	62,786	81,457	28,054	680,950
Mr KE Mkhize	12	509,698	62,786	81,457	24,857	678,798
Mr AE Muller	10	401,995	48,808	59,539	20,555	530,897
Mr CO Phillips	12	508,653	39,367	81,457	27,142	656,619
		1,928,999	213,747	303,910	100,608	2,547,264

10 Future operating lease commitments

	2007 R	2006 R
10.1 Equipment	**793,404**	555,400
Vehicles	**40,973**	35,100
Property	**2,212,053**	2,576,930
Up to 1 year	**3,046,430**	3,167,430
10.2 Equipment	**2,776,912**	-
Vehicles	**-**	73,685
* Property	**4,424,106**	216,078
1 to 5 years	**7,201,018**	289,763

* The NNR has signed a two year lease on the building with an option to renew annually

11 Related party transactions

During the year under review, the NNR, in the ordinary course of its business, entered into various transactions with related parties which terms are no less favourable than with third parties.

Directors

Details of directors' emoluments are disclosed under note 9.

Transactions with Directors

All directors have given genaral declarations of interest in terms of section 243(3a) of the Companies Act. These declarations indicate that no member of the Board hold other directorships in South African entities with whom transactions are conducted by NNR in terms of a customer /supplier relationship.

Transactions with National Departments of Government

All National Departments of Government are regarded to be related parties in accordance with circular 4 of 2005: Guidance on the term "State controlled entities" in the context of IAS 24(AC126) - Related parties, issued by the South African Institute of Chartered Accountants. No transactions are implicated by simply the nature of the existence of the relationship between entitikes. However, the following transactions were recorded relating to transactions with related parties as defined above:

Name of related party	Nature of transaction	Income
Department of Minerals and Energy	Contribution	14,742,000
Eskom	Authorisation fees	27,452,740
Pebble Bed Modular Reactor (Pty) Ltd	Authorisation fees	8,974,934
PBMR Fuel Fabrication Plant	Authorisation fees	2,111,749
Necsa - Pelindaba	Authorisation fees	967,885
Necsa - Vaalputs	Authorisation fees	351,958

11 Related party transactions (continued)

Name of related party	Nature of transaction	Expenditure
SA Post Office Ltd	Deliveries	721
Telkom SA Ltd	Telephone	724,444
SARS	Paye	6,681,577
CSIR	Publications	7,553
SA Bureau of Standards	Staff welfare	38,177

12 Notes to the cash flow statement

	2007 R	2006 R
12.1 Cash generated by operations		
Operating surplus	**14,448,325**	984,953
Adjustment for:	**2,434,749**	3,439,389
Depreciation	**780,953**	809,528
Net loss on disposal of obsolete assets	**32,637**	103,139
Foreign exchange gain / loss	**-**	-
Increase / (Decrease) in provision for leave pay and bonuses	**(159,841)**	(95,278)
(Increase)/Decrease in provision for pension retirement benefit	**-**	-
Increase / (Decrease) in provision for retirement medical benefit	**1,781,000**	2,622,000
Increase / (Decrease) in provision for doubtful debts	**-**	-
Increase / (Decrease) in defferred income	**-**	-
Working capital changes	**(5,656,584)**	6,978,949
(Increase) / Decrease in accounts receivable	**(5,339,964)**	7,218,924
Increase / (Decrease) in accounts payable	**(316,620)**	(239,975)
	11,226,490	11,403,291
12.2 Cash and cash equivalents		
Cash and cash equivalents consist of cash on hand. The carrying amount of these assets approximate their fair value. Cash and cash equivalents at year-end are represented by the following balance:		
Cash at Bank	**65,942,651**	50,983,624

13 Financial instruments

Financial instruments consist of cash and cash equivalents, trade and other receivables, and trade and other payables.

13.1 Credit risk

Financial assets, which potentially subject the NNR to concentrations of credit risk, consist principally of cash and trade receivables. Trade receivables are presented net of the allowance for doubtful debts. Credit risk with respect to trade receivables is limited owing to the large number of customers being dispersed across different industries. Accordingly the NNR has no significant concentration of credit risk.

The carrying amounts of financial assets included in the balance sheet represent the exposure of the NNR to credit risk in relation to those assets. Trade and other receivables are controlled by policies and procedures. The NNR does not have any significant exposure to any individual customer or counterparty.

13.2 Interest rate risk

The company's exposure to interest rate risk and the effective interest rates on the financial instruments at the balance sheet date are:

31 March 2007

	Weighted average effective interest rate %
Assets	
Cash	6.25%

13 Financial instruments (continued)

13.3 Foreign currency risk

The NNR undertakes certain transactions denominated in foreign currencies; hence exposure to exchange rate fluctuations arises. It is not the policy of the NNR to take out cover on these outstanding foreign currency transactions because these transactions take place on an *adhoc* basis.

13.4 Fair value of financial instruments

	2007 R	2006 R
At 31 March 2007 the carrying amounts of cash, accounts receivable and accounts payable approximated their fair values due to the short-term maturities of these assets and liabilities. The net fair value of the assets and liabilties of the NNR are stated below:		
Assets		
Cash and cash equivalents	**65,942,651**	50,983,624
Trade and other receivables	**7,854,526**	2,514,562
Liabilities		
Trade and other payables	**1,567,522**	1,884,142

14 Accounting for Government grant in terms of AC 134 and IAS 20

14.1 Nature and extent of Government grant recognised

Grant received from the Department of Minerals and Energy (DME) for the rehabilitation of the sites in the Karoo. The funds allocated were ring fenced for this purpose for a period of two years ending 31 March 2007. During the current financial year prospecting licences were issued by DME covering the sites which were initially earmarked for rehabilitation. Effectively the need for this project has ceased. The NNR is negotiating with DME not to repay the money and use it for similar purposes.

14.2 Unfulfilled conditions in terms of the grant recognised

Government grant received		18,000,000
Expenditure recognised in the Income Statement		-
		18,000,000

15 Value-added statement

- Revenue	**68,197,464**	53,255,775
- Paid to suppliers for materials and services	**(19,712,912)**	(19,847,941)
- Interest earned	**4,361,233**	2,770,863
Total wealth created	**52,845,785**	36,178,697
- Salaries, wages and other benefits	**33,255,274**	31,613,353
- Providers of capital	-	-
- Net financing costs		
- Dividends	-	-
- Central and local government	-	-
- Reinvested in the organisation to maintain and develop operations	**24,767,172**	4,565,344
- Depreciation and recoupments	**780,953**	809,528
- Retained income	**23,986,219**	3,755,816
Total wealth distribution	**58,022,446**	36,178,697
Value-added ratios		
- Number of employees	**72**	75
- Revenue per employee	**947,187**	710,077
- Wealth created per employee	**733,969**	482,383

21 Abbreviations

AADQ	Annual Authorised Discharge Quantity
AFRA	African Regional Co-operative Agreement
ALARA	as Low as Reasonably Achievable
ARN	Argentinean Nuclear Regulatory Authority
ARPANSA	Australian Radiation Protection and Nuclear Safety Authority
ASN	French Nuclear Regulatory Authority
AVN	Association Vinçotte Nucléaire of Belgium
Bq	Becquerel
CAA	Civil Aviation Authority
CBO	Community Based Organisations
CMC	Cape Metropolitan Council
CNS	Convention on Nuclear Safety
CNSC	Canadian Nuclear Safety Commission of Canada
CoCT	City of Cape Town
COR	Certificate of Registration
DEAT	Department of Environmental Affairs and Tourism
DGSNR	Directorate of Nuclear and Radiation Protection
DME	Department of Minerals and Energy
DOC	Disaster Operations Centre
DoL	Department of Labour
DWAF	Department of Water Affairs and Forestry
ECC	Emergency Control Centre
EdF	Electricite de France
EPR	European Pressurised Reactor
EPSOC	Emergency Planning Steering and Oversight Committee
GAAP	General Accepted Accounting Practices
GRAP	Generally Recognised Accounting Practices
HEU	Highly Enriched Uranium
HPC	Health Physics Controller
HTGR	High Temperature Gas Cooled Reactor
IAEA	International Atomic Energy Agency
ICT	Information Communication and Technology
INES	International Nuclear Event Scale
INPO	International Nuclear Power Operations
INSAG	International Nuclear Safety Group of the IAEA
IRRS	Integrated Regulatory Review Service
IRSN	Institute of Radiation Protection and Nuclear Safety
INLA	International Nuclear Law Association
INLEX	International Nuclear Liability Expert Group
ISI	In-service inspection
KEDC	Koeberg Environs Development Committee
KINS	Korea Institute of Nuclear Safety of South Korea
KLI	Key Licensing Issue
KNPS	Koeberg Nuclear Power Station
LEU	Low Enriched Uranium
LOCA	Loss of coolant accident
LSA	Low Specific Activity
LUA	Lead Use Assembly
MDEP	Multinational Design Evaluation Programme
µSv	microSievert
mSv	milliSievert
MTR	Material Test Reactors
MWe	Megawatt Electrical
NDE	Non-destructive Evaluation
Necsa	South African Nuclear Energy Corporation
NEPROC	Nuclear Emergency Preparedness Regulatory Oversight Committee
NERS	Network of Regulators of Countries with Small Nuclear Programmes

NGO	Non-governmental Organisation
NIA	National Intelligence Agency
NII	Nuclear Installations Inspectorate of the United Kingdom
NLM	Nuclear Liabilities Management
NNR	National Nuclear Regulator
NNR Act	National Nuclear Regulator Act
NORM	Naturally Occurring Radioactive Material
NTWP	Nuclear Technology and Waste Products
OTS	Operating Technical Specification
PAM	Protective Action Management System
PAZ	Protective Action Zone
PBL	Process Based Licensing
PBMR	Pebble Bed Modular Reactor
PFMA	Public Finance Management Act
PN	Problem Notification
PRPP	Public Radiation Protection Programme
PSA	Public Safety Assessments
PWR	Pressurised Water Reactor
QFD	Quartz Fibre Dosimeter
RaSIA	Radiation Safety Infrastructure Appraisal
RD	Requirement Document
RENS	Regulation of Natural Sources
RO	Regulatory Officers
RPM	Radiation Protection Monitor
RPO	Radiation Protection Officer
RPS	Radiation Protection Specialist
RPV	Reactor Pressure Vessel
RSR	Railway Safety Regulator
RSRP	Regulations on Safety Standards and Regulatory Practices
RTMC	Road Transport Management Corporation
SAG	European Union Safety Advisory Group
SAMSA	South African Maritime Safety Authority
SAR	Safety Analysis Report
SCM	Special Case Mine
SHEQ	Safety, Health, Environment and Quality
SKI	Statens Kärnkraftinspektion of Sweden
STC	Steering Technical Committee
TLD	Thermo-Luminescent Dosimeter
TSC	Technical Support Centre
TSO	Technical Support Organisation
US-NRC	United States Nuclear Regulatory Commission
WANO	World Association of Nuclear Operators
WCA	Wonderfonteinspruit Catchment Area
WGCMO	Working Group on Component Manufacturing Oversight
WHO	World Health Organisation

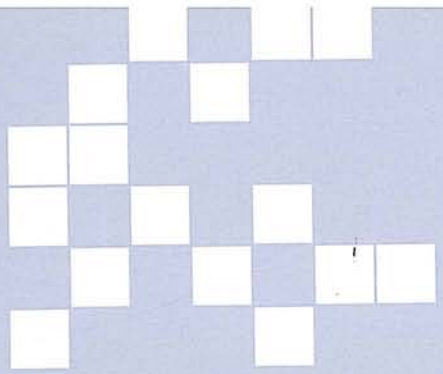
22 Glossary

Term	Definition
Action	• The use, possession, production, storage, enrichment, processing, reprocessing, conveying or disposal, or causing to be conveyed, of radioactive material; • Any action, the performance of which may result in persons accumulating a radiation dose resulting from exposure to ionising radiation; or • Any other action involving radioactive material.
Assessment	The process, and the result, of analysing systematically the hazards associated with sources and actions, and associated protection and safety measures, aimed at quantifying performance measures for comparison with criteria.
Becquerel (bq)	The unit of radioactivity in nuclear transformations (or disintegrations) per second.
Clearance	Removal of radioactive materials or radioactive objects within actions authorised by a nuclear installation licence, nuclear vessel licence or certificate of registration from any further control by the Regulator.
Collective dose	An expression of the total radiation dose incurred by a population, defined as the product of the number of individuals exposed to a source and their average radiation dose. The collective dose is expressed in person-sievert (person.sv).
Critical group	A group of members of the public which is reasonably homogeneous with respect to its exposure to a given radiation source and given exposure pathway and is typical of individuals receiving the highest effective dose or equivalent dose (as applicable) by the given exposure pathway from the given source.
Decommissioning	Administrative and technical actions taken to allow the removal of all of the regulatory controls from a facility (except for a repository which is closed and not decommissioned).
Defence in depth	The application of more than a single protective measure for a given radiation or nuclear safety objective, so that the objective is achieved even if one of the protective measures fails.
Discharge	A planned and controlled release of radioactive nuclides to the environment.
Disposal	The emplacement of radioactive waste in an approved, specified facility without the intention of retrieval. The term "dispose of" has the corresponding meaning.
Disused sealed source	A radioactive source comprising radioactive material that is permanently sealed in a capsule or closely bonded and in a solid form (excluding reactor fuel elements) that is no longer used and is not intended to be used for the action for which an authorisation had been granted.
Dose	The amount of radiation received, where the use of a more specific term such as "effective dose" or "equivalent dose" is not necessary for defining the quantity of interest.
Dose constraint	A prospective and source-related restriction on the individual dose arising from the predicted operation of the authorised action which serves exclusively as a bound on the optimisation of radiation protection and nuclear safety: • To limit the range of options considered in the optimisation process, and • To restrict the doses via all exposure pathways to the average member of the critical group, in order to ensure that the sum of the doses received by that individual from all controlled sources remains within the dose limit, and which, if found retrospectively to have been exceeded, should not be regarded as an infringement of regulatory requirements but rather as a call for the reassessment of the optimisation of radiation protection.

Term	Definition
Dose limit	The value of the effective dose or equivalent dose to individuals from actions authorised by a nuclear installation licence, nuclear vessel licence or certificate of registration, that must not be exceeded.
Emergency planning	The process of developing and maintaining the capability to take actions that will mitigate the impact of an emergency on persons, property or the environment.
Emergency preparedness	The capability to promptly take actions that will effectively mitigate the impact of an emergency on persons, property or the environment.
Emergency response	The performance of actions to mitigate the impact of an emergency on persons, property or the environment.
Environmental monitoring	The measurement of external dose rates due to sources in the environment and of radioactive nuclide concentrations in environmental media.
Exposure	The act or condition of being subject to irradiation.
Exposure pathways	A route by which radioactive material can reach or irradiate humans.
Inspector	The person appointed as such in terms of section 41(1) of the NNR Act.
Minister	The Minister of Minerals and Energy.
Monitoring	The continuous or periodic measurement of radiological and other parameters or determination of the status of a system.
Nuclear accident	Any occurrence or succession of occurrences having the same origin and resulting in an unintended/ unauthorised exposure to radiation or release of radioactive material, which is capable of giving rise to an effective dose in excess of 1 mSv to the public off-site in a year, or in excess of 50 mSv to a worker on site received essentially at the time of the event.
Nuclear authorisation	A nuclear installation licence, nuclear vessel licence, certificate of registration or certificate of exemption.
Nuclear damage	Any injury to or the death or any sickness or disease of a person; or other damage, including any damage to or any loss of use of property or damage to the environment, which arises out of, or from, or is attributable to, the ionising radiation associated with a nuclear installation, nuclear vessel or action.
Nuclear incident	Any unintended event which is reasonably capable of giving rise to an effective dose equal to or in excess of 0.1 mSv to the public off site received essentially at the time of the event, or the unintended spread of radioactive contamination or exposure to radiation, which could reasonably give rise to an effective dose in excess of 20 mSv to a worker on site received essentially at the time of the event, or significant failure of safety provisions.
Nuclear installation	A facility, installation, plant or structure designed or adapted for or which may involve the carrying out of any process, other than the mining and processing of ore, within the nuclear fuel cycle involving radioactive material, including but not limited to: • A uranium or thorium refinement or conversion facility; • A uranium enrichment facility; • A nuclear fuel fabrication facility • A nuclear reactor, including a nuclear fission reactor or any other facility intended to create nuclear fusion; • A spent nuclear fuel reprocessing facility; • A spent nuclear fuel storage facility; • An enriched uranium processing and storage facility; and • A facility specifically designed to handle, treat, condition, temporarily store or permanently dispose of any radioactive material which is intended to be disposed of as waste material; or Any facility, installation, plant or structure declared to be a nuclear installation in terms of section 2(3) of the NNR Act.

22 Glossary (continued)

Term	Definition
Nuclear safety	The achievement of safe operating conditions, prevention of nuclear accidents or mitigation of nuclear accident consequences, resulting in the protection of workers, the public and the environment against the potential harmful effects of ionising radiation or radioactive material.
Radiation protection	The protection of people from the effects of exposure to ionising radiation, and the means for achieving this.
Radiation protection monitor	A person technically competent in radiation protection matters relevant for a given type of action who is designated by the holder of a nuclear authorisation to perform radiation measurements.
Radiation protection officer	A person technically competent in radiation protection matters relevant for a given type of action who is designated by the holder of a nuclear authorisation to oversee the application of relevant requirements.
Radiation protection specialist	A person trained in radiation protection and other areas of specialisation necessary in order to be able to assess radiological conditions, to mitigate radiological consequences or to control doses.
Radioactive material	Any substance consisting of, or containing, any radioactive nuclide, whether natural or artificial, including, but not limited to, radioactive waste and spent nuclear fuel.
Radioactive nuclide	Any unstable atomic nucleus which decays spontaneously with the accompanying emission of ionising radiation.
Radioactive waste	Any material, whatever its physical form, remaining from an action requiring a nuclear installation licence, nuclear vessel licence or certificate of registration and for which no further use is foreseen, and that contains or is contaminated with radioactive material and does not comply with the requirements for clearance.
Radioactive waste acceptance criteria	The quantitative or qualitative criteria, specified by the operator and approved by the regulator, for radioactive waste to be accepted by the operator of a repository for disposal, or by the operator of a storage facility for storage.
Risk	(Qualitatively expressed) the probability of a specified health effect occurring in a person or group as a result of exposure to radiation or (quantitatively expressed) a multi-attribute quantity expressing hazard, danger or chance of harmful or injurious consequences associated with actual or potential exposures relating to quantities such as the probability that specific deleterious consequences may arise and the magnitude and character of such consequences.
Safety assessment	An analysis to evaluate the performance of an overall system and its impact, where the performance measure is radiological impact or some other global measure of impact on safety.
Safety case	A collection of arguments and evidence in support of the safety of a facility or action. This normally includes the findings of a safety assessment and a statement of confidence in these findings.
Safety culture	The assembly of characteristics and attitudes in organisations and individuals which establishes that, as an overriding priority, protection and safety issues receive the attention warranted by their significance.
Source	Anything that may cause radiation exposure, such as by emitting ionising radiation or releasing radioactive substances or materials; a complex or multiple installations situated at one location or site may, as appropriate, be considered as a single source.





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